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Table of Contents

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ORIGINAL ARTICLES— PAGE.
"Listerian Oration: Disease and Individuality," by F. WOOD JONES, F.R.S. 65
"The Significance of Failing Vision," by J. RINGLAND ANDERSON, M.C., M.B., F.R.C.S., D.O.M.S. 71
"A Criticism of the Term Manic Depressive Insanity," by W. A. T. LIND, M.B., B.S. 75
"Some Early Printed Books: Their Authors and Printers," by LESLIE COWLISHAW, M.B. 77
"A Treatment of Chronic Gonorrhœa," by FRANK TRINCA, M.C., M.B., B.S., and GEORGE FOREMAN, M.B., B.S. 81

REPORTS OF CASES—
"Diabetic Tabes, So-Called," by JOHN BOSTOCK, M.B., B.S., D.P.M. 82
"An Unusual Case of Hydatid of the Liver," by HAROLD R. DEW, M.B., F.R.C.S. 83
"Venesection in Pneumonia," by C. D. BATEMAN, M.B., Ch.M. 83

REVIEWS—
History of Preventive Medicine 84
Analytical Reagents 84
Ophthalmology, Otology and Allied Studies .. 84

LEADING ARTICLES—
Research 85

CURRENT COMMENT—
Experimental Epidemiology 86

ABSTRACTS FROM CURRENT MEDICAL LITERATURE— PAGE.
Physiology 88
Biological Chemistry 89

MEDICAL SOCIETIES—
The Melbourne Pædiatric Society 90
Nominations and Elections 92

CORRESPONDENCE—
The Defence of the Tonsil 92
Hospital Practice 93

OBITUARY—
John Flynn 93

NAVAL AND MILITARY—
Appointments 93

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—
Tasmania 93

THE MEDICAL DIRECTORY 93

THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN, SYDNEY 94

BOOKS RECEIVED 94

MEDICAL APPOINTMENTS 94

MEDICAL APPOINTMENTS VACANT, ETC. 94

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 94

DIARY FOR THE MONTH 94

EDITORIAL NOTICES 94

Listerian Oration.[1]

DISEASE AND INDIVIDUALITY.

By F. WOOD JONES, F.R.S.,
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IT is not always the simplest and most apparently obvious facts that are the most fully appreciated. When we say that it is the main business of the physician to know if his fellow men are well or unwell, we make a statement the truth of which is so obvious that it is apparently valueless. Nevertheless, I am sure that it is not always sufficiently impressed upon the medical student that his first concern in dealing with humanity is to ascertain whether the individuals with whom he is brought into any degree of professional contact, are in a state of ease or disease.

There is a tendency in modern medicine to rely so far upon the abundant tests that may be applied to the organs, tissues, or fluids which compose the human body, that it is by no means impossible for the medical student, equipped with all the great advantages that the most advanced modern teaching provides him, to fail to know if he is dealing with a sick man or a well one, until the full ritual of certain tests has been conducted.

It may be that during all the centuries through which medical science has evolved, there has come more and more into prominence that aspect of it which at first sight seems to link it to those other sciences with which it has not and strictly speaking cannot have any real kinship.

The human mind loves order in the arrangement of knowledge, it hungers after rules and formulæ and exactness and many an address, such as this, has been given before medical societies in which the dawn of a great day in medicine has been predicted and welcomed—the day when medicine takes its place as an exact science. That day has not dawned yet and the dawn will be long in coming: for when we deal with humanity—a complex of human physical structure and human mentality—exactness is by no means easily come by.

When we deal with things purely physical, we may make exact diagnoses from physical data and the physicist and the chemist may hold us ever in

[1] Read at a meeting of the South Australian Branch of the British Medical Association on May 27, 1926.

contempt since to them it is a simple thing to give an apparently easy solution to many of our problems. A physicist may measure with the most minute exactness the result produced by any definite force acting under known conditions; the chemist can predict to us precisely what will be the result of the addition of some known quantity of a chemical reagent to the contents of his crucible. We may strive—and we are striving—to realize the dreams of the physicist and the chemist, but we must not hope for a complete fulfilment of these dreams. A physical trauma of definite intensity and applied in a definite manner does not produce the same result in all humanity. The scratch of a needle inflicted in the simple process of vaccination may cause a robust man to faint and leave a delicate girl unmoved. A definite psychic trauma may produce no apparent impression upon one, but for another it may mean a disturbance so profound as to result in a life-long mental alienation. A definite amount of any given chemical substance, administered under exactly similar conditions to two individuals, may produce profound effects in the one case and none whatever in the other. The day has not yet come, despite the contributions towards exact diagnosis made by the physicist and chemist, when we can apply their methods and hope to achieve their results. Until it comes, it is vain to expect that our students will be able to learn from a series of routine tests the answer to the question most urgently in the mind of the patient: is he really ill, will he shortly die or may he live to be a hundred despite his present state of unwellness?

However much may be learned from chemical and physical tests, it must ever rank in second place to that ancient lore of the fathers of medicine; it must be preceded by a knowledge which may make it possible to know if a patient is in reality a sick man or not. I have come to believe that it is the absence of this knowledge and of the teaching of this lore that constitutes the greatest failure in our present medical curricula and begets the greatest difficulties for our young medical men. What is to happen before the results of all the tests are made available? What shall we do with the patient? What advice shall we give him in order that he may regulate his life until the chemical and physical examinations have all been completed and the results of all the tests have been computed? In truth it is not unlikely that a man might die today before his highly trained medical attendant had become aware of the fact that he was ill.

There are two factors in diagnosis, two factors underlying the whole of medicine; there is the knowledge of the physical and chemical reactions of the constituent parts of the human body under varying normal and pathological conditions and there is the knowledge of the patient as a human individual in some phase of ease or disease. The one factor absorbs almost all our activities of research and of teaching; the other is in great danger of complete neglect.

The reason for this state of affairs is writ large in the history of our art. How are we to regard disease? What in essence is illness?

In all ages and with all peoples opinions have not been alike and the differences in the views have naturally affected the dual aspect of the question, for disease, to adopt the title of Morgagni's great work, has a seat and a cause. There are, in reality, two questions involved. What is affected? What is the agent that produces the effect? With all primitive peoples the answers to both questions have been natural and simple. It is the human individual who is affected and it is an agency akin to human identity that causes the conditions manifested in his illness. There is no question in the primitive mind that it is the patient himself as an individual entity that is the seat of the disease, and it may be another human individuality or an individuality somewhat more or less than normally human or an individuality completely inhuman that is the cause. The illness of an Australian aboriginal must almost necessarily be caused by the agency of one of his fellows; the illness of some people even today is caused by witches or their kin and the illness of a very large section of humanity is still caused by evil spirits of one sort or another. Whatever the human, semihuman or spirit cause, there is no doubt that it is the individual patient as a human entity that is affected. There may be local manifestations it is true, the complaint may be most conspicuous in his leg; but his leg shows the effects of the agency that has directed its malign influence towards him. It is not that there is something amiss with his leg and that therefore he is a sick man; but he is a stricken man and his leg shows it.

This idea of the illness of the individual is not by any means confined to the primitive or backward races; it is the keynote of the medical lore of all the classical fathers of medicine. For them it was still the man who was ill, for them an individual was in a state of disease, but that which caused his disease was no longer the malign influence of his fellows or of the creatures of his spirit world; it was rather an upset of the regulation of some of his bodily functions or what we should now term a pathological process. What these pathological processes might be—a derangement of the "elements" or of the "humours" or the "vital spirits" or what-not—need not detain us. What is essential is that we should realize that for the classical fathers of medicine the pathological process affected and was affected by the whole man as an individual entity.

It was a more precise knowledge of gross anatomy that produced the next phase in the evolution of ideas concerning disease. The work of Vesalius had made a precise knowledge of normal human structure available to all who practised the healing art. The great master of normal human anatomy gave his knowledge to the world in 1543; but two centuries were to pass before that knowledge was to be turned to full account in the study of disease and the great master of morbid anatomy was to teach all men a new truth.

In 1761, when Morgagni was in his eightieth year, morbid anatomy came into its kingdom with the publication of "*De Sedibus et Causis Morborum per*

Anatomen Indagatis" and thenceforth disease was to be regarded as the effects of pathological processes affecting definite parts of man's anatomy—an organ or a viscus—rather than the whole man as an individual. We may say that before Morgagni's time the physician thought in terms of a sick man; after his time in terms of a diseased stomach, a diseased liver or of some other part or member afflicted by a pathological process. This was indeed a vast change in outlook. The methods employed for treating a sick man were very different from those likely to succeed in treating a diseased stomach. A witch doctor, an exorciser or a priest might hope for some success in dealing with a fellow being in a state of disease, but they could hardly expect to have the same influence over an organ affected by a definite pathological process. The attention of the healer was therefore turned to the organ rather than the individual.

In this restriction of the conception of disease the importance of the individual is beginning to shrink into the background, but further evolutions of thought were still to come and in their coming the microscope played greatest part.

In 1800 Bichat published his *"Recherches sur la Vie et sur la Mort"* and two years later laid the world under further debt with the appearance of the *"Anatomie Générale."* Like Vesalius, Bichat had completed his great work whilst in the second decade of his life; like Morgagni he was concerned with the seats as well as the causes of disease. It was Bichat who made men look even beyond organs for the actual constituents of the human body that were affected by pathological processes. It was Bichat who showed that it was in reality the tissues that composed the organs rather than the organs themselves that were the real seats of disease.

The individual had been dethroned by Morgagni and the organ substituted in his place. Bichat again upset the dynasty, the organ was replaced by the tissue and the individual shrank still further into insignificance.

But even the tissue pathology of Bichat was not destined to mark the end of this progress of thought; before half a century had passed Virchow had accomplished his greatest work and the minds of all men were turned to the doctrine of cellular pathology. The *sedis morborum* was not the individual, the organ, nor the tissue, but the cell itself—the ultimate subdivision of the living body.

This is the story of the seats of disease and it is like enough to the story of the house that Jack built. It is the sick cell that makes the sick tissue, the sick tissue that is responsible for the sickness of the organ and the sickness of the organ that manifests itself by the disease of the individual. Is it any wonder that the study of the individual in ease or disease is a subject that has become rather pushed into the background with the passage of five centuries of medical research?

In the final tracking down of the seat of disease it is obvious that there is a great gain of scientific accuracy; our knowledge has become more precise. We may the more easily extinguish a fire if we know where it has its source, we may the more easily deal with a pathological process if we know precisely where it originates.

But with all these comfortable words we must take care not to be lulled into the placid belief that all is now solved. We may know the exact nature of the pathological factor that creates the disease, we may know the exact site of its incidence; but we must still retain the disconcerting knowledge that we cannot inevitably predict the course of the pathological process that is initiated. We have tended to eliminate the individual from our calculations, but nothing is more certain than that we cannot rightly eliminate the individuality. Where and in what then does individuality reside? Again we shall find that many different answers have been given to these questions as biological science has progressed from concept to concept in the evolution of the completeness of its store of knowledge.

In that stage of thought in which the individual was regarded as the seat of the disease, individuality was naturally a simple conception. It found its place and its expression in the whole bodily make-up of the subject. It was in some sort an essence of his whole complexity, a spirit, a soul, a something that was him and that, living inside him, made him what he was.

However greatly the cellular pathology of Virchow has influenced the forms of our thought, we still retain an ancient heritage by which we think of men rather than their cells as being sick. However strongly we may have been influenced by Bichat's substitution of vital forces of tissues for vital spirits, we still speak of our fellows as being in good spirits or bad, in high spirits or low. No matter what genetecists may teach us about the seat of individuality, no disaster ever occurs at sea without us all alluding to the number of souls that perished in the waves. Perhaps it is as well that, even at this late date, we still retain some archaic thought forms.

One thing we may be certain of in this evolution of knowledge. We may be sure that once man has conceived the idea that the individuality is a product of the whole bodily entity, he will set about the task of ordering his knowledge by classifying his fellows into different types of bodily entities. He will order them into definite classes by virtue of their bodily characteristics, he will grade them and he will feel assured in his knowledge of his fellows. He will assign temperaments and diatheses to definite types of humanity. He will card index all mankind with regard to their bodily make-up and on the label of each he will be able to write what will be his idiosyncracy, his proclivity, his temperament or his diathesis. This is an ancient weakness and one that is fortunately not dead even now. In 1881 Sir Jonathan Hutchinson gave much attention to this subject and in his preliminary lecture on the "Pedigree of Diseases," he wrote that:

> Our forefathers, who knew far less about the details of pathology than we do, attached far more importance to such matters as temperament and diathesis. They were accustomed to prescribe for a man's temperament; we

think only of his disease and turn aside with weariness from classifications of diathesis in which the physicians of an older day delighted.

We turn aside—not perhaps with weariness—but because of the accumulated weight of more recent teaching. Certainly we turn aside from no real reason for mistrusting any instinctive leaning towards the business of classifying our fellows into types possessing temperaments. Indeed there have been many revivals of the ancient thesis that our fellows may be sorted out and labelled. There have been many modern recrudescences of this teaching under newer guises.

Lombroso carried the classification of types to such a degree of perfection that he reduced the business at times to apparent absurdity and there were many who, when his teaching was the fashion, faced the world in shame since they lacked lobules to their ears. More recently America has been the scene of several attempts to reinstate this creation of definite types of humanity and one of the most discussed, though in reality one of the least successful, was that initiated by Bryant and Goldthwaite which divided all mankind into the so-called herbivorous, carnivorous and omnivorous types. In the herbivorous type the ears are said to be "thick, wide and simple"; in the carnivorous type to be "thin, long and convoluted." So once again we may have shame in our ears.

We have seen that in the case of disease Morgagni directed attention to the organ rather than the patient, so in this question of temperament there has been a like limitation in the conception of the seat of the individuality. Many have sought its habitat in separate systems rather than in the whole complex of systems that constitutes the human body. We may take the course of lectures delivered in 1861 by Dr. Laycock as presenting a summary of the then orthodox conception of what may be termed organic temperament. In this scheme of classification were categories embracing groups of humanity distinguished by temperaments due to the individualities of their various systems and organs. There were those with peculiar temperaments of the nervous system, those with individualities of the vascular or muscular systems or of the digestive apparatus or the lymphatic tissues. For Dr. Laycock the adherent lobule of the ear was of special significance in the diagnosing of general paralysis and any part or organ might have its individuality and so help in compounding the temperament of the whole.

It was Sir Jonathan Hutchinson who went a stage further and in the matter of temperament marched with Bichat in pathology, for throughout his lectures there is his oft-repeated insistence on the fact that temperament or diathesis is in its essential nature "an inherited proclivity of tissue" and his demonstration of such diatheses as those accompanied by a manifestation of psoriasis, ichthyosis or of xanthelasma strongly support his doctrine of tissue idiosyncrasy.

But as with disease, so with individuality, matters were not to rest even with the tissues and we all know from the findings of the modern genetecists that it is in the cell itself—nay in those nuclear fragments, the chromosomes—that individuality finds its home. We are driven back to the cell again. I think that maybe medical men have been somewhat overawed by the modern findings of the advancing science of genetics and that we have all been overinclined to attach too narrow an interpretation to these findings. It is even possible that the great pioneers of the science of genetics have themselves created all unwittingly this impression. Many who have only partially assimilated the results of recent work, have conceived a feeling of helplessness. So much has been given to the chromosomes that all attention to the individual has seemed to be mere temporary patch work. We have come to realize that again in our quest we are driving back to the cell. Surely there is justification for our present day reliance upon chemical and microscopical tests and laboratory findings.

It is the cell that is diseased; it is the cell in which reside all those peculiarities of individuality that determine what shall be the manifestation and the progress of the disease. What then is our concern with the individual? It were enough to examine and test his cells and apply our treatment to them regardless of anything that may appear peculiar or significant in the general condition or make-up of the patient himself.

But we must not forget that whatever powers we may delegate to the chromosomes and to the cell, the human body itself is but a complex of cells, all of which have been developed from the original unit that inherited the individuality. We also know that whatever there is of individuality inherent in the original cell will be shared in some manner by the whole of the vast progeny of the fertilized ovum. This point of view is at times lost sight of by those devoting attention to the more practical branches of medical science.

In the process of ontogeny a vast host of cells is begot from the initial division of a fertilized sex cell and from this vast host all types of tissue cells are developed in the differentiation of the parts and organs of the body. But despite all this differentiation it is still true to say that in the whole structure of the individual every cell partakes of the inherited bias inherent in the chromosomes of the original cell and in addition to this it has its own definite characters as a specific type of cell. A muscle cell, a nerve cell or an epithelial cell developes according to its own particular type, but nevertheless, in that it is a descendant of the original cell from which the growth of the body originated, it carries in its composition some share of the inherited peculiarities of the original chromosomes. In some of the resultant cells the original peculiarity is readily recognized in the tissues that develope from them. In others such recognition is impossible; nevertheless, we must believe that the peculiarity is always there in some form or other that we are unable to detect. If we take as an example that simple condition of adherent or absent lobule of the ear that attracted the attention of the fathers of medicine, of Lombroso, of Dr. Laycock, of Sir Jonathan Hutchinson, of Darwin

and many others, we may appreciate this thing. This simple anomaly is inherited. Its characters are carried in the chromosomes of the original cell from which the growth of the body took origin. We must suppose that every cell resulting from the division of that original cell shares in the peculiarity, but only in those cells which constitute the lobes of the ear is the peculiarity capable of manifestation. A man who has inherited adherent lobules, would seem in reality to have inherited more than that. He has inherited a cellular individuality which in the cells composing his ears manifests itself in a manner that we may recognize; but which in all the other cells of his body remains undemonstrated by any manifestations we may detect. Nevertheless it is logical to suppose that the cell individuality is there. A more striking case is presented in the very remarkable picture of cell inheritance manifested in the condition of congenital cataract. The individual peculiarity that shows itself as an opacity of the lens, is carried in the chromosomes of the cell from which the patient is begot. Every cell in the whole complicated body resulting from the division of this original cell shares in that peculiarity, but only in certain of those cells which constitute the tissues of the lens of the eye, is the peculiarity capable of manifestation. A patient who manifests an inherited cataract, has in reality inherited more than a mere opacity of a portion of his lens. He has inherited a cellular individuality which in the cells composing his lens reveals itself in a manner that we may recognize, but which in all the other cells of his body remains unrevealed by any manifestations that we can detect. Nevertheless it is logical to suppose that the cell individuality is there. The lens of the eye according to Nettleship constitutes one three-millionth part of the entire mass of the human body and only about one-twentieth part of the lens becomes opaque in cases of congenital cataract. We may say, therefore, that the inborn individuality is capable of manifesting itself to our inspection in only one sixty-millionth part of the patient's whole body; but in all the remainder of his body the cells are steeped in that individuality that is able to demonstrate itself in so few. Here indeed is a thought, derived directly from the work of the modern genetecists, that would have delighted Samuel Butler: a man who inherits a congenital strabismus (if such is a Mendelian character) not only squints with his eyes, but every cell in his whole make-up inherits a squinting bias. He squints in every part of his organization, but his eyes alone show it to casual inspection.

Now in certain cases we may see a wider verification of this thesis. The peculiarities of the tortoiseshell cat have been known for centuries. The tortoiseshell cat inherits a chromosomal arrangement which determines that black and white and yellow are present in its coat colour. Here the peculiarity of cellular character is manifested more deeply, for not only is the coat colour tortoiseshell but every cell of the cat's whole body is steeped in some peculiarity that manifests itself in the inevitable display of feline femininity. There are cases in which the carefully controlled experiments of genetecists have gone much further, and we can see in the resulting products of germinal cells with definite chromosomal variations a very complete modification in the whole body. The Jimson weed (*Datura stramonium*) has yielded wonderful results under the controlling hands of Blakeslie and Billing and as a result of their work we know that with a known chromosomal variation of the original cell every portion of the resulting plant may show characteristic modification. It is not only an adherent lobule of the ear, an opacity of the lens of the eye or a coat colour and a definitely related sexual complex, but the whole composite structure of the living organism which shows the results of individual cell inheritance.

When we regard inheritance from this wider point of view we see that it is not unlikely that the medical profession in general has taken the findings of the genetecists too narrowly. In assigning the seat of individuality to the chromosomes and to the originating cell we do not rob the whole complex, completed, adult body of any opportunities of manifesting diathesis or temperament or individuality. Rather we enlarge its scope, for we may truly say that every cell of our bodies is thoroughly steeped in our own inborn, inherent individuality. Our bodies are the resulting complexes of individuality. When we imagine a man to be fanciful in thinking he can recognize diathesis or temperament in one or two obvious structural peculiarities in his patient, we must remember that what he can see, is only a very small fraction of the myriad entities in which it is present. It is, in reality, no more fanciful for an experienced physician to look to see a certain proclivity to disease in a patient whose external peculiarities he has noted, than it is for an animal dealer to assume that a cat is a female because he has remarked that it has a black and yellow and white in its coat colour. What the fathers of medicine believed was not wrong. Their fault was that their knowledge was incomplete and it is our great shortcoming that we have in no way enlarged that knowledge, nor attempted to enlarge it. That every living being has a cellular individuality which manifests itself now in one, now in another visible and obvious stigma is certainly true. We have yet to link the often obscure and inconspicuous manifestation with the deeper, less obvious and more widespread phenomena that are prone to accompany it. The study of diathesis has not been ended: truly it has not yet been begun.

That a cellular individuality clings to every person is, I think, obvious. That this cellular individuality may evidence special physical proclivities is generally tacitly admitted, though it may be no special study is devoted to the subject. But I would indeed go further than that and affirm that it is not unreasonable to attempt to see in the external peculiarities of an individual not only his proclivities to disease, but also a great deal of what we might term his proclivities to behaviour. In order to appreciate this concept we must go back to an early stage in human—and animal—development and attempt to realize the remarkable circum-

stances that surround and accompany the first stages of development of the central nervous system.

In all branches of science it is the primary phenomena that are bewildering and which, as they cannot be taught dogmatically, since knowledge is so scant, are apt to be passed over lightly in our educational courses. It is in our primary concepts of all natural phenomena that we take so much for granted: it is in the terminal ramifications of knowledge, based on the assumed mastery of these primary phenomena, that we demand so rigorous a proof and so minute an analysis of results. Much of the mystery of the unfolding of the early stages of embryonic development remains unsolved, but as to the meaning of certain processes we may make at least a reasonable guess. The developing embryo of any living creature is a cellular mass and this mass consists of a certain proportion of cells that are exposed on the surface of the embryo, and others that are contained within the body of the embryo and are not exposed upon its surface. The embryo of all living things consist of cells which constitute its surface layer, and cells which constitute the tissues which are contained within its developing body. Now we may say that in a general way it is the purpose of the cells of the surface layer that they should know about the conditions that surround the animal, whilst it is the function of the cells of the deeper layers of the body that they should act upon this knowledge. In the case of a unicellular animal the single cell both knows and acts, but in multicellular animals there must be a division of function and only the cells of the outer layer can know of the environment and only the cells of the deeper layers can act upon the knowledge. The outer cells must be knowing or sensory, the inner cells must be acting or motor. It is obvious that in a multicellular animal there must be some mechanism for the handing on to the acting cell of the knowledge gained by the knowing cell. This is what in more technical language we know as the conveyance of a stimulus from the sensory mechanism to the motor mechanism. In a small and simple type of multicellular animal this stimulus may pass by mere protoplasmic continuity of the adjacent sensory and motor cells, but such a simple device will not be a success as the body grows larger and more complex. Some fresh attempt must be made to keep the acting cells in touch with the knowing cells. In all animals the problem is ultimately solved by some of the knowing, surface cells sinking into the body tissues and thereby making a link between the knowing cells still exposed on the surface of the body and the acting cells within. These inwardly wandering cells have the knowledge of the outside world as their birthright and with this knowledge they are enabled to interpret the messages or stimuli handed in from the exposed surface cells to the hidden acting cells. At first in the phylogenetic story these wandering go-between cells may sink in more or less haphazard from any portion of the body surface, but such a method cannot indefinitely satisfy the demands of the ever perfecting animal. A more ordered method is devised. A certain area of the embryonic surface is set apart for this purpose and over this area all the cells which were at first simple surface cells, are infolded into a neural groove, then into a neural tube and finally into a buried central nervous system.

Curiously enough this business has been twice evolved and in all the invertebrates it is the mid-ventral line of the surface layer of the embryo that is set aside for the purpose of migration into the thickness of the body of the embryo, whilst in all the vertebrates it is the mid-dorsal region from which the central nervous system is made. It matters not if the sinking in of surface cells be more or less haphazard; if it be the mid-ventral area or the mid-dorsal area which sinks in as a neural tube, the purpose is always the same—some knowing cells are translated from the surface to the depths of the body in order to keep up communication between the surface of the animal which knows of its environment, and the deeper tissues which react in response to stimuli derived from the environment. Such in essence is the central nervous system, no matter what its perfected complexity may be; it is a portion of the outer surface of the embryo sunk into its interior; an area of its knowing, feeling cells migrated inwards to make link between the cells still left exposed upon the surface and those that have never known of the outside world. We may say that the central nervous system consists of skin migrated inwards or alternatively that the skin is central nervous system still left exposed as the covering of the body. Indeed we would gain in teaching if we dwelt upon the existence of two nervous systems, the one consisting of the sense organs and the skin exposed upon the surface of the body—an external nervous system—and the other buried beneath the surface as the internal nervous system. In the adult body they are anatomically separated; in the embryo and in their essential nature at all stages, they constitute a single entity. The external nervous system is for ever displayed for our inspection, its buried moiety —the internal nervous system—is hidden from our sight; nevertheless, it is always a part of and atune with that which we can see. It is by no means fanciful to say that the wise physician should look to see in the common exterior of his patient or as we should say in his external nervous system, many suggestions as to the conditions prevailing in his hidden central nervous system. Every physician of any experience knows that this is true and in his practice is accustomed to rely upon a whole system of unclassified, unassorted and individually acquired dicta, derived from this very knowledge. What we may term the diatheses of the central nervous system, temporary or permanent, depend upon this vague, intangible, yet all important knowledge. But we may follow the logical bearing of these facts a stage further and in the ordinary ruling of our commerce with our fellows each one of us is accustomed to take this step.

The external nervous system is the exterior of the individual, his appearance, what he looks like. The internal nervous system is the hidden portion that dictates his reactions and behaviour; it is what

he is. What an individual looks like and what he is are then all one, all part of a single system. Appearance and behaviour are essentially correlated, since both are the products of a single tissue entity. When we deal with the lower animals we are accustomed to recognize that appearance and behaviour are correlated; in our patients the same fundamental truth holds good. A knowledge of ontogeny should not lead us to despise that type of knowledge which, often stigmatized as "womanly intuition," enables some people to diagnose very accurately the proclivities of conduct of their fellows by regard to their external characters.

When the genetecist cultivates the chromosomal variations of the Jimson weed, he sees every portion of the plant altered as a result of definite chromosomal alteration; its whole structure and habit are changed; every adult cell is imbued with the peculiarity inherited from the parent cell. The whole appearance of the Jimson weed is altered, but we may not speak of its conduct or behaviour. But with man, when every cell of his body inherits a definite chromosomal bias, the manifestation of this bias may be demonstrated in a far wider manner, since man is a complex of human physical structure and human mentality. The elements that give rise to the basis of human organic constitution, human appearance and human behaviour may all be steeped in one common factor of individuality. Darwin saw in the form of the human ear definite evidences of ancestry; Dr. Laycock conceived that its variations gave evidence of definite organic and temperamental tendencies; for Lombroso the ear was an index of proclivities of conduct and in certain of its variations indicated an actual stigma of criminality. All were right.

With the inheritance of a definite chromosomal bias a human being may show in all portions of his structure, in his appearance, his temperament and in his behaviour a definite entity of individuality. Were we disposed to follow the train of thought that would have been so acceptable to Samuel Butler, we might say that a man who inherited a congenital strabismus which manifested itself in a squint of his eyes, also had a squint in all the cells of his body and might readily display a squint in his conduct.

But apart from this fanciful extension of the subject we may at least claim that the whole study of the question of human diathesis is in its infancy. We may justly ask that the physician should lay the solid foundations of this science by recording those findings which, no better than generalized impressions today, may make the permanent basis of a new science tomorrow. Nearly half a century ago Sir Jonathan Hutchinson, in concluding his lectures on the pedigree of disease, said:

> Whether I have succeeded in convincing you that it would be a convenience in medical teaching and practice to revive the old doctrines of diathesis I do not know. To my mind it does appear, I may confess, that the states to which I have sought to apply that name are realities which it is very desirable to recognise.

In a like manner I would conclude this address today.

THE SIGNIFICANCE OF FAILING VISION.[1]

By J. RINGLAND ANDERSON, M.C., M.B. (Melbourne), F.R.C.S. (Edinburgh), D.O.M.S. (London),
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The most important and the most frequent symptom of ocular disorder is failing vision.

THE HISTORY OF THE PATIENT.

The first step in investigating most medical problems is the taking of a careful history. The patient's story may help us in arriving at a correct diagnosis. For it is of importance to know whether the failure is complete or partial, transient or permanent and the onset sudden or gradual. One, however, may be misled by the patient on the last point. Vision may have been failing for a number of years. One day the patient covers the unaffected eye. To his astonishment he cannot see. This he considers a recent and sudden loss. More frequently the only answer to the query of "how long?" is the familiar and not very helpful remark "for some time."

Transient misty attacks with a frontal ache and an appearance of coloured rings round lights are the beginnings of glaucoma. Transient failures without pain may herald papillœdema, arteriosclerotic retinitis, glaucoma or they may be migrainous in origin.

The association of visual loss with local pain is of value. Corneal and iritic lesions, glaucoma and refractive errors are the common causes. This association is not met with in lesions of the posterior half of the globe, for tissues there are insensitive to painful stimuli.

VISUAL ACUITY.

The next step is the testing of the remaining vision. If this improves when the patient looks through a perforated disc, a refractive error is present. This finding, however, must not prevent one from seeking a more serious cause.

CAUSES OF FAILING VISION.

The causes of failing vision may be enumerated as follows: (i.) errors of refraction, (ii.) opacities in the media, (iii.) fundus lesions due to ocular diseases, (iv.) fundus lesions due to general diseases, (v.) nerve lesions.

Errors of Refraction.

Myopia.

The most serious error of refraction is short-sightedness. It is due to an elongation of the globe. It may rapidly progress, especially during the years from eight to eighteen. The increase may be associated with stretching and atrophy of the chorioid. Permanent incapacity may result. The error must be carefully corrected under atropine. Great care should be taken regarding school work and general health. The eye, like a strained heart,

[1] A lecture demonstration given at the Melbourne Post-Graduate Course, November, 1925.

may distend as a result of overuse in bad conditions during febrile and other periods of ill health.

Astigmatism.

During school days, when small letters and figures are being studied, small degrees of astigmatism may lead to eye strain. If uncorrected, the error increases. The increase may necessitate the wearing of glasses constantly in later life. Adults read quickly because they recognize words. Children, however, learning to read, must study closely each of the unfamiliar letters. Especially is this so in algebra. A similar strain is felt by adults when first reading German script.

Hypermetropia.

Long-sightedness often leads to difficulty with reading. It unlike myopia is not progressive. In youth the ciliary muscle is strong enough to neutralize a considerable degree of hypermetropia. However, as years pass it weakens and becomes incapable of making the necessary effort. So the hypermetropia which has been present all along, becomes manifest. Difficulty with reading ensues. This weakening of the muscle continues. In the early forties even normal sighted people begin to have difficulty with near work, especially at night. An illness or excessive near work may hasten the unmasking of latent hypermetropia and the onset of this period of presbyopia. Convex lenses improve the failing near vision.

Opacities in the Media.

The failure of vision may be due to some opacity in the media. If a beam of light is thrown obliquely by a condensing lens into the eye, its transparent tissues may be studied. The cornea may show some defect. Often a lesion there will be revealed by examining the window frame reflection on its surface or by staining it with fluorescine. An unsuspected foreign body or the dots and striæ of a keratitis may be found.

In old age the pupil, having lost the jet black appearance of youth, appears cloudy and dull. Occasionally the patient's friends consider this to be an early cataract. However, it is a normal accompaniment of age. It is due to sclerosis of the lens nucleus. We can distinguish this from a cataract by adopting the second method of examining the media. If a light is placed above and behind the patient's head and reflected by a plane mirror through the pupil, a cataract affecting the central area of the lens will show as a black opacity. Defects in the cornea lens and vitreous may be found by this method. If during the examination the eye is rotated, the movement of the opacity in relation to the pupil will show whether it lies in front of or behind the plane of the iris. A similar parallactic displacement is of value when one attempts to gauge the swelling or cupping of the disc. The media may be further studied through a + 12·0 diopter spherical lens in the opthalmoscope when light is reflected in by the small mirror.

Cataract.

The first consideration must be: "What is a cataract?" Small lens opacities occur in all patients over sixty. Therefore, it is unwise to consider that all opacities are due to cataract formation. The point of value to the patient is the present or future interference with vision. An opacity showing through a partially dilated pupil will be centrally situated. If not of the rare congenital or non-progressive type, it will soon lead to failing vision. Peripheral opacities which are best seen through a fully dilated pupil, are more common, but their significance is diverse. Opaque sectors, narrowing from a broad peripheral base as they run centrally, are progressive. Usually they are seen first in the inferior nasal quadrant. The time taken for a cataract to ripen is so variable that a guarded prognosis must always be given. The process is often so slow that one does well to tell only a relative of the patient that an early cataract is present. A frequent query is: "Must my cataract be ripe before it can be removed?" Though extraction is simpler when a cataract is mature, it is wise to consider surgical interference when the visual loss interferes with the patient's usual occupation. Sometimes it is wise to use artificial means to ripen the cataract.

Only too frequently has the stone blind patient admitted that he would have sought advice earlier, but a friend with failing vision was told to return for treatment when all vision was lost. If the loss is due to cataract, this advice is unwise. But if the condition should be glaucoma, it is tragic. Therefore a middle-aged patient with failing vision must be examined most carefully. If the lens changes are insufficient to account for the loss, one must beware of glaucoma.

If the media are clear, one may find the cause in the fundus. Lesions there may be due to a general disease or they may be an ocular affection.

Fundus Lesions Due to Ocular Diseases.

Retinal Detachment.

Trauma, myopia and chorioidal sarcoma are the common causes of retinal detachment. No satisfactory explanation can be found for a certain percentage. Small areas of detachment may be missed, but the large grey undulating area is easily found. Perhaps the gravest error in ophthalmology is to miss a detachment due to sarcoma. Now that it is possible to transilluminate all doubtful areas, even the most posteriorly situated, a much earlier diagnosis can be made.

Retinitis Pigmentosa.

Retinitis pigmentosa is a very chronic and progressive form of chorioidal degeneration. It usually commences in childhood. Increasing night blindness is the characteristic symptom. The fundi manifest typical black areas of pigment which resemble bone corpuscles in shape. The intermediate zone of the fundus is most affected.

Macular Degeneration.

Progressive visual loss especially in old age may be due to one of the several forms of macular degeneration. Eradication of all sources of toxins is indicated.

Glaucoma.

One cannot overemphasize the value of recognizing glaucoma in the earliest possible stages.

The onset of the acute form may be the first indication of any trouble. Usually, however, there have been slight but neglected symptoms. This form is undoubtedly grave. But the chronic form is no less grave. It may lead to the complete loss of vision in one eye and serious loss in the other without any symptom or obvious sign.

Primary glaucoma is rare before the fortieth year. Hypermetropic eyes and those with small corneæ are most commonly affected. The exciting causes appear to be worry, strain, ill health, insomnia and anything that leads to congestion.

Symptoms which should suggest glaucoma are: (i.) Frontal aches associated with transient mistiness or even brief loss of sight; (ii.) the appearance of coloured rings round lights during the attack of ache and mist is pathognomonic; (iii.) a weakening of the ciliary muscle which leads to difficulty in reading and a desire for a rapid increase in the strength of reading glasses.

It is well to remember that central vision may remain full in the presence of advanced glaucoma. The characteristic loss is of the nasal field.

The treatment of acute glaucoma should begin at once. The essentials are eserine, heat, leeches, morphine. If there is no improvement after a few hours an iridectomy must be done. If one has neither the training nor the instruments a temporary lowering of tension should be obtained by a posterior sclerotomy. With a cataract knife or very fine tenotome the sclera is punctured 1·25 centimetres (half an inch) behind the limbus in the inferior temporal quadrant. The knife should be entered for six millimetres (quarter of an inch) and slightly rotated when being withdrawn. An iridectomy should be performed as soon as possible.

Sometimes a rise of tensions occurs in iritis. If this follows the use of atropine or if pain and discomfort follow its use it should be discontinued. It may be necessary to instil eserine or tap the anterior or posterior chamber. If in iritis with full tension the use of homatropine leads to reduction of the pain, it is wise to continue its use and even use atropine.

Fundus Lesions Due to General Diseases.

The fundus pictures which are more or less typical of certain diseases, are composed of various component lesions. These lesions must be similar to those in other organs. In the fundus, however, they are laid bare and magnified, elsewhere their presence is postulated or proved *post mortem*.

Hæmorrhages may occur in the vitreous and so obscure the fundus. They may lie between the vitreous and the retina and appear boat-shaped when the patient is erect, the main mass of the blood sagging down. They may lie superficially in the retina. The radiating nerve fibres will then lead to the typical flame shape of anterior retinal hæmorrhages. If lying deeply in the retina with pressure equal in all directions from surrounding tissues, they will tend to be circular.

Œdema of the retina leads to a loss of detail and a dull greyish colour. Exudate, lying superficially in the retina, is white or grey. It appears yellowish when deeper in the retina or in the chorioid. Chorioidal tubercles are good examples of the latter. If the retina lying anterior to a deeper exudate is œdematous, the edges of the exudate will appear blurred. This is a characteristic of renal retinitis. Œdema of the disc shows first as a blurring of the nasal margin. Later a swelling appears which pushes forward into the vitreous like a mushroom. Hæmorrhages and white areas appear on its surface. If it becomes grey and less transparent, the onset of atrophy is to be feared and the saving of vision may already be beyond hope.

Sometimes the exudate areas become organized and the scar formation leads to areas of atrophy. These are white with clear cut edges and lie deep to the retinal vessels. Sometimes chorioidal vessels course across them. Black pigment may fringe them or even cover them. The pigment is a proliferation from the retinal pigment layer. It is often seen in chorioidal or deep retinal lesions. Sometimes the pigment migrates and forms black areas shaped like bone corpuscles. At times the retinal vessels appear partly sheathed in black. These changes are seen typically in *retinits pigmentosa* and in disseminated chorioiditis. Atrophy of the optic disc may follow a disease of the retina or the optic nerve. The disc loses its transparent pink colour and becomes white and opaque. If œdema or inflammation of the nerve has preceded the atrophy, the disc margin will be irregular and blurred and its details obscured.

What are the diseases that can cause these lesions?

Arteriosclerosis.

The appearance of the retinal vessels is usually a guide to the state of the cerebral vessels. In one series of cases with gross lesions of the cerebral vessels 70% of the patients had diseased retinal vessels. Much can be learned by studying arteries where they cross veins. A vein can be dimly seen through a normal artery crossing it. When the walls become thick, however, the vein becomes hidden. The thickened artery also tends to push the vein out of its normal course and to lessen its lumen by pressure. As sclerosis and endothelial hypertrophy increase, the artery ceases to be of uniform calibre and becomes more tortuous. The normal light reflex along its convex surface becomes brighter and wider as the middle coat thickens. Sometimes exudate in the lymph sheath around the vessel shows as white lines along each side or even as a complete sheath hiding portion of the vessel from view. Hæmorrhages are frequent, usually being small and superficial. Numerous small white sharp-edged areas of exudate are found round the macular area and disc. Sometimes the disc is blurred or even swollen. A sudden loss of vision may be the first indication of retinal arterio-

sclerosis. On examination distended tortuous veins, profuse widespread hæmorrhages and blurring of detail due to œdema make up the picture of thrombosis of the central retinal vein. When the central artery is suddenly blocked by thrombosis or embolus, the fundus appears pale and the macula may appear as a red spot.

Nephritis.

Nephritis is perhaps the commonest cause of retinitis. If one excludes the cases occurring during pregnancy the occurrence of retinitis implies that the renal trouble is of considerable standing. It is much more common in interstitial than parenchymatous nephritis. The exudate areas are usually soft, woolly patches with ill defined edges. The well known star at the macula is the most characteristic appearance. It is composed of small dots of exudate arranged in lines radiating from the macula. It is not quite pathognomonic of renal retinitis, for occasionally it is seen in arteriosclerosis, papilloedema and other conditions leading to retinal œdema. Hæmorrhages are always present. Sometimes they are partly white in colour and sometimes they leave brown areas of pigment behind them. There are usually signs of vascular degeneration. Papilloedema may be the only change in the fundus.

During pregnancy failing sight is a symptom which usually heralds grave disorder. The œdema and exudate may lead to retinal detachment. If labour is brought on, the visual prognosis is moderately good.

Diabetes.

There is a typical diabetic retinitis, but as in the other diseases atypical forms are common. It may not be possible then to say which disease is present. The features of a retinitis which strongly suggest diabetes, are solid, soapy looking exudate areas with clear cut edges and hæmorrhages chiefly small and deep. The soft edged cotton wool patches and the macular star are not seen, the necessary œdema not being a feature of diabetes. The average age for renal retinitis to appear is thirty-seven, but diabetes causes retinitis only in older patients. It is uncommon under forty. Only 6% of patients with renal retinitis live for two years after its appearance, whereas 60% with diabetic retinitis live for that time. The prognosis in arteriosclerotic retinitis is intermediate. The immediate causes of death vary according to the nature of the retinitis. Diabetic coma and gangrene, cerebral hæmorrhage and cardiac failure and uræmia are the characteristic causes. Renal retinitis is almost always bilateral, the other forms are sometimes unilateral.

Pernicious and Secondary Anæmia.

Pernicious and secondary anæmia frequently lead to pallor of the disc and fundus and to hæmorrhages. Some of the latter may have white centres. Fundal changes are present in most cases of leuchæmia. The veins appear engorged and are nipped by the normal arteries at intersections. Hæmorrhages may be numerous and often present pale centres.

Syphilis.

Syphilis may affect the fundus in many ways. It may lead to optic atrophy, papilloedema, retinal œdema and disseminated chorioiditis. The early areas of infiltration in the last named disease appear rounded and yellowish. They lie in the chorioid and so are deep to the retinal vessels. Œdema of the overlying retina obscures the edges of the areas and so they appear ill defined. Later partly or completely pigmented areas of atrophy are seen. These must be distinguished from the areas due to pigment proliferation in *retinitis pigmentosa*. Chorioidal vessels may course across the atrophic areas. Often the atrophy extends to the disc which becomes waxy and white.

Brain Diseases.

The eye and the brain develope from the same tissues. The internal carotid artery supplies both organs with blood. Therefore, it is not surprising that they react in a similar way to the same injurious agents. We have seen how vascular degeneration affects both organs simultaneously. In a similar way the essential tissue of each which is nervous in nature, is affected by the same poisons.

In 15% of patients with tabes and cerebral syphilis there is optic atrophy. It is said that 50% of patients with disseminated sclerosis have some visual defect. Approximately 13% of intracranial tumours are accompanied by optic atrophy. In 80% of these there is papilloedema. The vessels in the disc form one of the main outlets for blood and lymph from the eye. The sheath of the optic nerve is in direct communication with the subarachnoid space. Therefore, an increase in pressure within the meninges may lead to a blockage near the disc. The resultant disc œdema may be present for a long time without any visual loss. Later a secondary optic atrophy sets in. It is well to exclude all opacity in the media before diagnosing papilloedema. Sometimes hazy media make the disc appear blurred. Unless the blurred disc margins are associated with swelling or hæmorrhages, one can rarely be certain that the appearance is not congenital.

All forms of meningitis may cause changes in the fundus. Basal meningitis may lead to either primary or secondary atrophy. Cerebro-spinal meningitis may cause papilloedema. The tuberculous form often produces a mild disc œdema and in the late stages chorioidal tubercles are frequently seen.

Poisons.

There are certain poisons which lead to visual loss and corresponding fundal changes. The optic nerve is most commonly affected and the poison is usually endogenous. The fundal picture will vary according to the distance of the lesion behind the globe. In many of these cases of retrobulbar neuritis the lesion is some distance from the disc and consequently the changes there are slight. A faint blurring of the margins may be the only defect.

If there is no visible alteration in the fundal picture, the condition will come into the next group. In this there is failing vision and yet neither the refraction nor the fundus show any abnormality.

Nerve Lesions.

Poisons.

In addition to the endogenous poisons already considered, various ectogenous poisons may lead to gross visual loss without any visible lesion.

Tobacco and quinine may cause grave loss by their effect on the retina. Lead may seriously affect the optic nerve fibres. In the same way toxins from septic foci and pressure from neighbouring structures may lead to failing vision. Later fundus changes may appear in the form of optic atrophy. It is well to remember that the fibres leaving the macular area are the most highly specialized, the best nourished and the most susceptible to injury, whether from pressure or poison. As a result macular or central vision is usually the first and the most affected by these causes. Sometimes, as in uræmia, poisons lead to failing vision by attacking the visual centres.

Cerebral Tumours and Vascular Lesions.

Cerebral tumours and vascular lesions by interference with visual nerve pathways may cause partial or complete blindness. In studying this group the examination of the pupillary reactions and of the visual fields is of the greatest importance. A bitemporal hemianopia is always due to a lesion near the chiasma, frequently a pituitary growth. A homonymous hemianopia means a lesion in this neighbourhood or one that is more centrally situated. A homonymous hemianopia due to pituitary disorder is usually associated with some loss of central vision, but rarely with papillœdema. But when this perimetric loss is due to a lesion in the temporal lobe, papillœdema is the rule and central visual loss the exception, until a secondary atrophy of the disc occurs.

The absence of normal pupillary reactions and bizarre and diverse perimetric findings helps the investigator to exclude hysteria and neurasthenia.

The localizing value of defective movements of the pupil is shown in the following summary.

A totally inactive pupil is due either to extensive iritic adhesions or to a paralysis of the muscles of the iris, namely *ophthalmoplegia interna.*

A pupil that is irresponsive to direct and indirect light, but active on convergence, is the rule in bilateral blindness. But if vision is present, the pupil is of the Argyll-Robertson type, which occurs rarely apart from tabes and general paralysis. The lesion is probably in the vicinity of the Sylvian aqueduct.

In unilateral blindness the pupil fails to respond only to direct light.

One characteristic of retrobulbar neuritis is a pupil which dilates after contracting, even though the eye is still exposed to the light. This points to a delay in the afferent pathway.

A CRITICISM OF THE TERM MANIC DEPRESSIVE INSANITY.

By W. A. T. LIND, M.B., B.S. (Melbourne),
Pathologist to the Victorian Lunacy Department.

FOR some years past the name maniacal depressive insanity has been applied to what was formerly known as melancholia, mania and alternating insanity. The new term introduced by Kraepelin to supplant the older ones was rapidly adopted by medical men in psychiatric practice and by medical men not in that special line of study who were not qualified to judge the suitability of the term. Many students and practitioners were undoubtedly influenced by the textbooks adopting the new terminology and by the argument, diagrams and so forth purporting to show that mania and melancholia were only phases of a disease called manic depressive insanity. Although older authorities in British psychiatric practice had years previously drawn attention to the fact that man's whole life was full of examples of periodicity, for example, cardiac, respiratory and menstrual rhythm, periods of sleep and waking, to say nothing of the influence upon him of the periodicity of the seasons, the sun and the moon, this nomenclature was hailed by some as being based upon quite a new discovery. How many of the psychiatric specialists checked for themselves the statements of Kraepelin? That there was a certain amount of checking is evidenced by the fact that the textbook writers varied in their definitions of this manic depressive insanity.

Nowadays one sees all cases of melancholia called maniacal depressive insanity, yet Kraepelin, the introducer of the term, makes a distinction between melancholia and maniacal depressive insanity. He says: "We see that this condition, maniacal depressive insanity, differs from that of our melancholic patient." On the other hand, he says: "Mania is nothing but a stage of maniacal depressive insanity" and: "Maniacal depressive insanity is often called *folie circulaire* or circular insanity on account of the cycle of recurrent conditions."

Craig's textbook says: "Kraepelin recognizes three forms of manic depressive insanity, *viz.*: the maniacal, the depressive and the mixed. As mania may exist apart from these periodic or circular conditions, it will be more convenient to describe maniacal states under the headings, 'simple mania,' 'acute mania,' recurrent mania'" *et cetera.* Again: "Many writers prefer to use the old term periodic or recurrent melancholia for these cases or if the mental disorder is an alternation between depression and mania, the term circular insanity or *folie circulaire* is employed."

Stoddart's textbook contains diagrammatic explanation of this maniacal depressive insanity in its various manifestations, but the text differs from Kraepelin very widely when it says: "Melancholia and mania are phases of intermittent or periodic insanity which is a synonym of maniacal depressive insanity. Kraepelin confines the use of the word melancholia to cases of senile depression, but such

a limitation of the word is considered by the physicians of this country to be unwarranted."

Thus three authorities define the condition manic depressive insanity differently, so that there can be no unanimity in the minds of those who have substituted it for the older terms mania, melancholia and circular insanity.

In all investigations it is the rule to reserve judgement until all the evidence has been submitted. In the question concerning the appropriateness of the term manic depressive insanity, the evidence for and against is not complete till the death of the patient. The histories of patients up till the hour of death will arrive at a more justifiable conclusion in this matter than will any other method of investigation. In support of this argument may be quoted a letter in *The British Medical Journal* of January 2, 1926, entitled: "The Ultimate Fate of Patients who Recover from an Attack of Insanity," by Dr. Edwin Goodall, who writes:

> Is it not the case that our knowledge of the fate of patients discharged well from the various kinds of institutions for care and treatment of mental disorder is very inadequate? Dr. Tuke (Statistics of Insanity, Dictionary of Psychological Medicine, Dr. Hack Tuke) conjectured that only 27% of the total persons admitted are likely to die sane. Dr. Tuke also makes the statement based upon statistics of the York Retreat (a registered hospital for the insane) got out by Dr. Thurnan, that of eleven persons attacked by insanity, six recovered and five died sooner or later during the attack. Of the six, not more than two remained well during the rest of their lives; the other four sustained subsequent attacks during which three of them died.

Textbooks, British and foreign, do not deal with the subject of Dr. Goodall's letter, so taking Dr. Tuke's conjecture that only 27% of patients die sane in conjunction with Dr. Thurnan's figures, it is reasonable to say that *post mortem* statistics, taken in routine as they are in the Victorian Lunacy Department, will be the most accurate method available of determining whether the manic depressive theory of Kraepelin can justifiably displace the elder nomenclature of Clouston and other authorities.

There were two hundred and seventy-five patients examined and the following groups were separated:

Group I.	One attack only	162 patients
Group II.	Two attacks	65 patients
Group III.	Three attacks	9 patients
Group IV.	Four attacks	5 patients
Group V.	Five attacks	1 patient
Group VI.	Seven attacks	1 patient
Group VII.	Circular insanity	12 patients
Group VIII.	Recurrent insanity other than mania and melancholia	6 patients
Group IX.	Vague history of "not the first attack"	14 patients

These cases are analysed in the accompanying synopsis.

SYNOPSIS SHOWING ANALYSIS OF THE DIFFERENT GROUPS.

One Attack Only.

	No. of Patients.
Melancholia	105
Mania	52
Agitated melancholia	5
Total	162

Two Attacks.

	No. of Patients.
Both melancholia	25
Both mania	26
First mania, second melancholia	3
First melancholia, second mania	1
First mania, second unknown	..
First melancholia, second unknown	..
First unknown, second melancholia	3
First unknown, second mania	4
Both manic depressive	2
First unknown, second dementia	1
Total	65

Three Attacks.

All melancholia	1
All mania	7
First attack unknown, second attack unknown, third attack terminal dementia	1
Total	9

Four Attacks.

Melancholia	1
Mania	2
First attack mania, second attack mania, third attack confused, fourth attack confused	1
All puerperal mania	1
Total	5

Five Attacks.

First four attacks unknown, the fifth was melancholia	1

Seven Attacks.

First attack unknown, the last five were mania	1

Circular Insanity.

Circular insanity	12

Vague History of "Not the First Attack."

Mania	4
Melancholia	1
Senile insanity	1
Acute delirium	1
Recurrent mania	4
Senile dement	1
Unknown	2
Total	14

Recurrent Insanity other than Mania and Melancholia.

First attack unknown, second confusional	2
First nervous breakdown, second acute delirious mania	1
First adolescent insanity, second mania, third mania	1
First nervous breakdown, second mania	1
First mania, second unknown, third unknown	1
Total	6

A review of this synopsis shows that out of 275 patients there were 162 who manifested no sign of periodicity. In Group II., out of a total of 65 there were 51 patients who showed no evidence of periodicity, four manifested definite periodicity, two were diagnosed as suffering from manic depressive insanity at both attacks, but there was no indication as to whether the condition was mania or melancholia or both and six were indefinite. In Group III. out of nine cases there were eight with no periodicity and one indefinite.

In Group IV out of five patients four manifested no periodicity and the fifth gave evidence of alteration in type rather than periodicity. Group V. and VI. are too small to be considered. Group VII. showed the periodicity of circular insanity. Group VIII. containing 14 cases is indefinite. Group IX. containing six cases is also too indefinite to be taken into consideration.

In spite of the incompleteness of the information regarding some of the previous attacks which is unavoidable in many of the patients who are admitted into State hospitals for the insane, this synopsis shows that there is no justification for the theory that mania and melancholia are phases of a disease called manic depressive insanity. A person with a weak respiratory system may have tracheitis, bronchitis, bronchopneumonia, lobar pneumonia or pleurisy without the attacks being called phases of the same disease. In the same manner, an individual with a vulnerable neurone may respond differently to different stresses, but as a rule, just as one individual will be susceptible to laryngitis or bronchitis, so will another individual be liable to melancholia at different times. Just because the periodicity of circular insanity is not understood, it is not justifiable to explain the occurrence of the comparatively common mania and melancholia so as to make it coincide with the comparatively rare condition of circular insanity. In any case, whose brand of manic depressive insanity do psychiatrists use? Kraepelin's, Stoddart's or Craig's? As Kraepelin is the introducer of the term, then the only genuine manic depressive insanity is that described by Kraepelin and as this, as has been stated above, excludes senile menlancholia and is according to these statistics totally incorrect, it is far wiser to keep to the older nomenclature used by Clouston and other British authorities.

SOME EARLY PRINTED BOOKS: THEIR AUTHORS AND PRINTERS.[1]

By LESLIE COWLISHAW, M.B. (Sydney),
Lindfield, New South Wales.

TONIGHT I propose to study the beginnings of printed books, more especially the medical variety.

It has been said that the importance of the study of beginnings is in every science quite out of proportion to the importance of the objects studied.

The great vice of medical education is its tendency to fix attention on the latest and best only, to the neglect of what has been accomplished in the past. At times the latest book on a subject is not the best. This failure of the latest to be the best comes chiefly from lack of knowledge of previous experience. Every year sees methods of treatment tried over again which were tried and found wanting many years before, and fresh discoveries vaunted which are only rediscovered. This waste of effort and time arises largely from an ignorance of what has been accomplished before.

In the words of Ecclesiastes, Chapter I., verses 10 and 11: "There is no new thing under the sun. Is there anything whereof it may be said, see, this is new? It hath been already of old time, which was before us."

Medical records have been found dating back to the earliest ages and medical texts, written on the clay tablets of Nineveh and Babylon, on the papyrus of Egypt and on the vellum manuscripts of the Greeks and Romans, can be studied in our museums.

It is not with these records which can hardly be called books, nor with the manuscript books written by the old monkish scribes in the middle ages and preserved in the old monasteries to be brought to light once more and printed in the early days of the Renaissance, that I propose to deal tonight.

I have chosen a few of my old medical books printed during the last years of the fifteenth and the early years of the sixteenth centuries, and will hope to show you that these volumes, while they are very old, are, to quote the words of John Milton, "not absolutely dead things, but do contain a potencie of life in them to be as active as that soul was, whose progeny they are; nay, they do preserve as in a violl the purest efficacie and extraction of that living intellect that bred them."

The books exhibited represent a portion of the gleanings of twenty-five years in old booksellers' shops all over the world and I can truthfully say to paraphrase Thomas Fuller in his book, "The Holy State," "when there is no recreation or business abroad, I have had a company of honest old fellows in their leathern jackets in my study which have found me excellent divertisement at home."

Before we come to the books I would like to say a few words on the invention of printing and the presses from which came these *incunabula* or cradle books as they are called. The year 1453, in which year occurred the fall of Constantinople, is generally looked upon as the dividing line between the mediæval and modern periods of history. At this time Henry VI. was king in England and Columbus had not yet sailed on his voyage of discovery. About this period occurred one of the greatest events in world history, the invention of printing from movable types.

This art was preceded by the production of simple pictures printed from wood blocks. The earliest of these which can be dated with certainty, is a picture of Saint Christopher which bears the date of 1423.

The next step was the cutting of lines of descriptive text below the woodcuts on the same block and finally a whole page of illustrations and text were cut on the same wooden block and printed off, thus forming what are known as block books. About thirty separate works in the form of block books are known, produced chiefly in the Netherlands and Germany. Only books of the most popular character were printed in this way from blocks. The books were of a nature lending themselves to pictorial or allegorical illustration, such as the *Biblia Pauperum* which contains a series of pictures from the life of

[1] Read before a meeting of the Section of Medical Literature and History of the New South Wales Branch of the British Medical Association on March 18, 1926.

Christ and the *Ars Moriendi*, a series of pictures representing the trials which beset the dying.

The art of printing from wood blocks was revived by William Morris at the Kelmscott Press in London during the last decade of the nineteenth century.

We now come to the invention of printing from movable types; that is, of letters formed separately which, after being grouped into words and sentences and paragraphs, could be redistributed and used again for all sorts of books.

The Chinese, Pi Cheng, is said to have invented movable types made of clay. In a recent book Dr. Carter, of Columbia University, has made out a very good case for the Chinese origin of the invention of printing from movable types. China, formerly regarded as the home of unpractical philosophers, is rapidly coming to be looked upon as the original home of many of our material benefits. Gunpowder, as Dr. Carter observes, levelled the feudal system, the compass discovered America and the world and finally paper and printing paved the way for the religious reformation and made possible popular education.

The exact route by which printing reached Europe, is still in doubt. The art of printing was in vogue in China about 700 A.D. and spread in the Far East and Central Asia, thence to Syria and possibly to Europe.

The question as to who is the inventor in Europe of movable types has never been definitely settled. Volumes have been written for and against the claims of various men and cities. The controversy has been finally narrowed down to two names, those of Gutenburg of Mainz and Coster of Haarlem and the balance of opinion is in favour of Gutenberg.

The first printed documents to which can be assigned a place or date, are the earliest issues of two papal indulgences which were printed at Mainz in the autumn of 1454, and before another year had elapsed the splendid Latin Bible with forty-two lines to a column appeared. This is popularly known as the Mazarin Bible from the fact that the copy in the library of the famous cardinal of that name first attracted notice.

In 1462 disturbances in Mainz dispersed the German printers all over Europe and led to the establishment of the first printing press in Italy in 1465. The first native born Italian printer was a physician of Messina, Joannes de Lignamine. The most famous printer of Italy and perhaps of the world was Aldus Manutius, born in 1450. His fame rests less on his actual printing than upon the efforts he made to popularize literature and to bring cheap, yet well produced books within the reach of the many. He writes in 1490: "I have resolved to devote my life to the cause of scholarship. I have chosen in place of a life of ease and freedom an anxious and toilsome career." Aldus carried on a correspondence with the most famous scholars of his day and in 1506 Erasmus came to Italy, where he lectured at the University of Bologna and Padua and in 1508 made his home at Venice with Aldus and supervized many of the editions of the classics which came from the Aldine Press.

Aldus found that his work and correspondence increased to such an extent that we find him writing as follows in 1514, the year before his death: "I am hampered in my work by a thousand interruptions. . . . Nearly every hour comes a letter from some scholar and if I undertook to reply to them all, I should be obliged to devote day and night to scribbling. Then through the day come calls from all kinds of visitors. Some desire merely to give a word of greeting, others want to know what there is new, while the greater number come to my office because they happen to have nothing else to do. 'Let us look in upon Aldus,' they say to each other. Then they loaf in and sit and chatter to no purpose. . . . .

"As a warning to the heedless visitors who use up my office hours to no purpose, I have now put up a big notice on the door of my office to the following effect: 'Whoever thou art, thou art earnestly requested by Aldus to state thy business briefly and to take thy departure promptly. In this way thou mayst be of service even as was Hercules to the weary Atlas. For this is a place of work for all who may enter.'"

Again we may say with the author of Ecclesiastes: "Verily, there is no new thing under the sun."

Having obtained good texts, Aldus turned his attention to type and format. He designed a new Roman type, modelled, so it is said, upon the handwriting of Petrarch. Its use has continued to the present day and is known to everyone as italic.

The first book printed in this type, the Aldine Virgil, measured fifteen centimetres by 8·75 centimetres (six inches by three and a half inches) and was sold for about two shillings of our money and marks Aldus as the pioneer of cheap and pocket editions.

The Aldine mark is a dolphin twined about an anchor and the name Aldus divided by the upper part of the anchor.

Printing was introduced into England by William Caxton, a mercer, born in the Weald of Kent about 1420. As he tells us himself in his first book, Caxton in 1469 had been living abroad some thirty years. About 1469 he entered the service of Margaret, Duchess of Burgundy, the sister of Edward IV., as her secretary and by her he was encouraged to continue a translation of Raoul le Fevre's "Histories of Troye" and this was printed at Bruges in 1475, the first book to be printed in English. Caxton migrated to Westminster in 1476, established his printing press and in 1476 appeared the first book printed in England, "The Dictes or Sayengis of the Philosophres." Until his death in 1491 his press was never idle and among other books printed by him appeared the second medical book printed in English: "The Governayle of Helthe with the Medecyne of the Stomache." This book appeared about 1493, its author is unknown. A facsimile reprint was published in 1858, but as only fifty-five copies were printed, it is nearly as rare as the original.

I can show you a facsimile of the first and only other medical book printed in English in the

fifteenth century: "A Litil boke the whiche traytied and reherced many gode thinges for the Pestilence made by the Bisshop of Arusiens. London. 1485." Its authorship was ascribed to the Bishop of Vasteras in Sweden who, being exiled, came to Montpellier and studied medicine. This legend has been exploded by Sudhoff who has shown that its author was the papal physician, Johannes Jacobi, of Montpellier, about 1364. The printer of this book was William de Machlinia, one of the first two printers in London.

The invention of printing had a very rapid spread; within twenty-five years one hundred and eleven places had established printing presses and some three hundred and fifty printers had produced books.

As Osler tells us, the fifteenth century is rather a barren century in the field of medicine; no great name is to be found and no great discovery was made. The art of printing during its infancy had very little effect on the advance of medicine.

At this period the three great centres of medical study were Montpellier, Paris and the universities of northern Italy. At Oxford and Cambridge medicine was also taught, but there were no medical faculties.

The influence of Arabian medicine was still supreme. This influence is seen in the fact that up to 1480 seven Arabian medical authors are represented by twenty-one editions. No edition of Galen or Hippocrates was printed before 1500 and only two commentaries on their works.

In Osler's list of medical books printed before 1481 the titles of two hundred and seventeen books are given. The first dates from 1467. It is of the nature of an encyclopædia and contains only a short section devoted to medicine. It was written by one Rabanus Maurus and was printed at Strassburg. The author was archbishop of Mainz in 847.

The earliest printed document relating to medicine is the unique "Purgation Calendar" of 1457 printed in the type of Gutenberg's Bible and now preserved in the *Bibliothèque Nationale* in Paris. It gives certain rules as to the favourable days for bleeding and purgation. These blood-letting calendars were very popular. They were planned year after year and gradually the majority of the leading printers produced them. The printers employed a physician to compile them and in some cases the name of the compiler or calculator was attached to the calendar. The first purely medical book was an edition of the works of John Mesue, the younger, printed at Venice in 1477.

The author was a Persian and owing to the Mohammedan objection to dissection of the human body, dissected apes in a special dissecting room which he built on the banks of the Tigris, and a particular species of ape which was thought to most closely resemble man, was by command of the Caliph supplied to him by the ruler of Nubia. Mesue is credited with inventing the preparation of extracts from various drugs. His books on *materia medica* formed the foundation of all the European pharmacopœias. The works of Mesue were reprinted many times, forming a favourite textbook. The edition of his works on the table is a comparatively late one, having been printed in 1541.

The oldest book I have to show you is an edition of the "Canon of Avicenna," printed at Padua in 1479 and, having been printed on November 6 of that year, is four hundred and forty-six years four months and a few days old. What wonderful changes have taken place in this world since this volume left its Paduan birthplace! One would like to know its history and the fates of its various owners during four and a half centuries.

In Avicenna Arabian science may be said to have attained its highest glory. A volume could be written about this wonderful man. Those of you who are interested, will find much of interest about him in Dr. Edward Browne's Fitz-patrick Lectures on "Arabian Medicine" recently published by the Cambridge University Press.

Avicenna was born at Bokhara in 980 A.D. At the age of ten he was proficient in the Koran and the Arabian classics. At the age of sixteen he studied medicine at Bagdad. When only eighteen he was called to attend the Sultan Mansur. He became court physician and gave himself up to all the pleasures of the court. His fall from favour was sudden. The Sultan had appointed his nephew as Governor of Avicenna's native province, but being displeased with the Governor's conduct, he ordered Avicenna secretly to poison him. This Avicenna would not do and the Governor finding out later of the Sultan's plot, disgraced Avicenna for not warning him. Worn out by hard work and hard living he died at the early age of fifty-eight. Avicenna amongst other things was a poet of no mean order and one of the quatrains ascribed to Omar Khayyam is said to have been written by Avicenna. The verse has been translated by FitzGerald:

"Up from the Earth's Centre through the Seventh Gate
I rose, and on the Throne of Saturn sate,
And many a knot unravelled by the Road,
But not the Master-knot of Human Fate."

Before leaving Avicenna I will take one anecdote from Dr. Browne's book which shows the power of suggestion in the treatment of disease.

A certain prince of the House of Buhwayh was afflicted with melancholia and suffered from the delusion that he was a cow. "Every day he would low like a cow, causing annoyance to everyone, and crying, 'Kill me, so that a good stew may be prepared from my flesh,' until matters reached such a pass that he would eat nothing, while the physicians were unable to do him any good." Finally Avicenna was persuaded to take the case in hand. First of all he sent a message to the patient bidding him to be of good cheer because the butcher was coming to slaughter him. Whereat, we are told, the sick man rejoiced. Some time afterwards Avicenna, holding a knife in his hand, entered the sickroom, saying: "Where is this cow, that I may kill it?" The patient lowed like a cow to indicate where he was. By Avicenna's orders he was laid on the ground, bound hand and foot. Avicenna then felt him all over and said: "He is too lean and not ready to be killed; he must be fattened." Then they offered

him suitable food of which he now partook eagerly and gradually gained strength, got rid of his delusion and was completely cured.

I also show you a later edition of Avicenna, that edited by Hugo Senensis or Hugh of Siena, and printed in 1498 at Venice.

In 1472 appeared the first edition of the *Regimen Salernitanum*. This famous poem was a collection of advice regarding the preservation of health drawn up by the Faculty of Salerno for the benefit of a King Richard and much of it still forms part of the old wives' medicine of the present day.

In 1478 appeared the only work of anatomy published in the fifteenth century, the *Anatomia* of Mundinus which was published at Pavia. The last decade of the century produced a number of treatises on special subjects, Ellenbog, Kamintus *et cetera* all wrote on the plague, while in the last three years of the century appeared several treatises on the so-called Neapolitan evil which was then making dreadful ravages through Italy. These early works on syphilis are of great interest from several points of view and Sudhoff and Singer have summarized them as follows:

They exhibit the earliest attempt to treat the newly recognized scourge of humanity as a separate and special medical topic and illustrate how the new art of printing had become an instrument for the advancement of knowledge. They also throw light on the history of the printed book. These early tracts on syphilis are the first examples of books actually written by contemporary authors and handed over direct from author to publisher or printer for immediate reproduction and distribution to the public. Nearly all the books previously printed were either ancient texts or compilations therefrom. Our present day custom of using the printed page to record one's views only very gradually came into vogue.

The authors of most of the books printed during the fifteenth and sixteenth centuries had in most cases been dead for centuries. An exception is found in a printed book on the plague. The *"Regimen wider die Pestilenz"* of Heinrich Steinheil, printed at Ulm in 1473, was the work of a physician who was still living when his book went to press.

Another class of early printed medical books has recently been studied by Ruhrah in his book "Pediatrics of the Past." The earliest special treatise dealing with the diseases of children is the *"Libellus de Ægritudinibus Infantium"* of Paulus Bagellardus, printed in 1472. On the table you will see a facsimile reproduction of this and other *incunabula* dealing with pædiatrics. Four books printed before 1500 deal with the diseases of children and as Ruhrah tells us they have a special interest as marking the birth of a definite study of this subject.

I will now pass on to consider the illustration of early printed books. The forerunners of the printed books, the manuscript books, were of course illustrated by miniatures done by hand and in some of the early printed books this method still survived. In one of the books on the table, the "Surgery of Guido Chauliac," you see a miniature which has been illuminated by hand after the book had left the printing press. In many of the early books the initial letters were not printed, but filled in in various colours afterwards by a scribe.

Woodcut illustrations were first employed by Albrecht Pfister in 1461. The first medical book with definite illustrations specially prepared for the purposes of illustrating the text was Ketham's *"Fasciculus Medicinæ,"* printed in 1491. I show you a recent reproduction of this work published by the Italian firm of Lier & Company in their series of *Monumenta Medica*. Botanical illustrations are first found in the encyclopædia of Bartholomeus Anglicus and in Konrad von Megenberg's *"Das Puch der Natur."* The encyclopædia of Bartholomeus was one of the most famous books of the middle ages and exists in many manuscripts in the old libraries; it was reprinted many times and contains a summary of the scientific knowledge of the times.

The first surgical illustrations may be studied in the reproduction of Jerome of Brunswick's *"Chirurgia"* which is exhibited on the table. This was translated into English and published in 1525 under the title of "The Noble Experyence of the Vertuous Handy Werke of Surgeri" and was the first surgical book printed in English.

A meagre little tract in Latin on anatomy was published in England by David Egar, a Cambridge physician, early in the sixteenth century; but the first anatomy of any importance printed in English was Thomas Vicary's "Englishman's Treasure" which was published in London in 1548. In the edition of the English translation of Bartholomew Anglicus's *"De Proprietatibus Rerum,"* printed in 1495, is to be seen the first picture of dissection in an English book. Anatomical illustration was very crude until the publication of the masterpiece of Vesalius in 1543 which revolutionized the science of anatomy as did the book of Fuchs that of botany.

There are several other early printed books on the tables, but I cannot describe them and their authors in detail; those of you who are interested, will find typewritten notes inserted in the volumes which give some details.

A few words may be said in explanation of the term "rare" as applied to medical books. Billings, the famous librarian of the Surgeon-General's Library in the United States of America, defines a rare book as one of which a copy is offered for sale in any catalogue only once in five years. The value depends on whether it is one for which there is a demand. Some of the rarest books are of small commercial value.

Rarity may be due to several causes, such as age, size, place where it was printed, number of copies originally printed.

As regards age all medical books printed prior to 1500 which are known as *incunabula* or cradle books, are rare. It has been estimated that there were one thousand editions of medical books printed before the close of the fifteenth century.

Books which were originally printed in the ordinary or vulgar tongue, such as English, French, German or Italian, are much rarer than those printed in Latin, especially works on surgery and midwifery.

As regards size folios are more easy to obtain than small books, their very size and heavy oak bindings have protected them, while the smaller books have been more handled and read and are more easily borrowed and not returned.

You will notice on examining some of the books that very many of them have no title page. The first books printed from movable types were imitations of manuscripts, so they followed in every detail the style of their prototypes. In the manuscript versions the titles were either a few words at the commencement or valedictory notices at the end of the book, stating generally that the book was written by so and so and imprinted by such and such. These notices are called colophons, from the Greek Κολοφών, a summit or finishing. If you turn to the bottom of the last page in many of these books you will find in the last paragraph the colophon. Sometimes the colophon gives the date and place, very often it omits them.

The earliest attempt at a formal title page so far recorded is to be found in a book printed at Cologne in 1470, but this was only a spasmodic effort and it is not until the year 1520 that the title page became a recognized part of the make-up of a book and on many of the title pages may be found the printer's mark or device in addition to the printer's name.

This concludes what I have to say about early printed books, but before showing you some lantern slides to illustrate my remarks, let me once again enter a plea for the study of the historical aspect of our profession. I cannot do better than quote from Osler.

"By the historical method alone can many problems in medicine be approached profitably. For example, the student who dates his knowledge of tuberculosis from Koch may have a very correct, but a very incomplete, appreciation of the subject. Within a quarter of a century our libraries will have certain alcoves devoted to the historical consideration of the great diseases, which will give to the student that mental perspective which is so valuable an equipment in life. The past is a good nurse, as Lowell remarks, especially for the weanlings of the fold."

Finally, in the words of old Fuller: "History maketh a young man to be old without either wrinkles or grey hairs; privileging him with the experience of age, without either the infirmities or inconveniences thereof.

"Yea, it not only maketh things past, present, but enableth one to make a rational conjecture of things to come. For this world affordeth no new accidents, but in the same sense wherein we call it a new moon, which is the old one in another shape, and yet no other than hath been formerly.

"Old actions return again, furbished over with some new and different circumstance."

A TREATMENT OF CHRONIC GONORRHŒA.

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THE main difficulties in the way of eradication of chronic gonorrhœal infection are the difficulty of access to the site of the prostatic infection and the small part played in immunization by the general immunity mechanism as is shown by the poor response to vaccine therapy. In the natural cure of the condition which usually eventuates after some months or years, such must be achieved as a result of the mild local inflammatory response which is represented by the gleet and its pus cells and immune bodies. The conception behind the present scheme was one in which it was concluded that if the pus cells, discharged over long periods, and the gleet were crowded into a relatively short period, eradication would be proportionately rapid. Further it was speculated that there must be some reciprocal relationship underlying the immunity response in the various parts of the urogenital tract and consequently if an inflammatory response could be occasioned in its urethral mucous membranes, it would determine a similar response in the cells of the prostate. Such response would be not only reciprocal, but might perhaps also result from lymphatic spread. The natural excitant of such processes is the gonorrhœal organism and accordingly a series of patients was taken and eight cubic centimetres (two drachms) of mixed gonorrhœal vaccine were injected into the urethra which was sealed by collodion for some hours and the vaccine was retained.

The first patient tested was suffering from gonorrhœa. He was a confirmed alcoholic who would not cease drinking during treatment. He was warned to expect a recrudescence of his discharge for some days and it was hoped that this would be followed by an improvement. In this case a definite purulent discharge resulted for five days and on its subsiding there was a decided improvement. As soon as further improvement ceased, the injection was repeated and was this time followed by a lessened response and still further improvement. After five injections the urethra appeared normal, but the patient disappeared before a smear could be taken.

Following on this case we decided to submit a series of patients whose gonorrhœa had been confirmed by bacteriological examination, to the same treatment at the Venereal Disease Clinic at the Alfred Hospital. The series consisted of over a dozen patients. In no instance after four to six injections could gonococci be cultured. In four cases to date no smear has been obtained and all the patients are definitely improved by the treatment, despite the fact that many of them indulged in alcoholic and sexual excesses. We are convinced that it is the best weapon for dealing with intractible gleet and improvement is not confined to the urethra, but also occurs in the prostate.

The pathologist reports that though in five patients bacteriological proof of gonococci was obtained before treatment, none has yet yielded a culture after treatment. The patients so far treated will be kept under observation for a confirmation of results so far attained. Efficiency of 100% cannot as a rule be claimed for any therapeutic measure and the experimental observations to date completely justify the adoption of the measure as an adjunct to present modes of treatment.

Reports of Cases.

DIABETIC TABES, SO-CALLED.

By JOHN BOSTOCK, M.B., B.S. (London), D.P.M.,
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THE patient whose history is here recorded, was demonstrated on November 12, 1925, at the Broughton Hall Psychiatric Clinic. A description was held over on the chance of its completion by pathological findings. Happily the patient's condition is such that this is postponed indefinitely.

Clinical History.

C.A.C., aged forty-two years, a carpenter, was admitted to Callan Park Mental Hospital on May 1, 1925, as a certified patient. His family has been exceptionally long lived and gave no history either of insanity or diabetes. Patient who is of fine physique, had been an athlete in his youth and he was proficient at his trade. He was ambitious and had achieved some civil successes. He married at twenty-three, has eight children alive, two died in infancy and there has been one miscarriage. Venereal disease and undue *potus* are denied

He says that he began to lose physical condition in October 1920. He had excruciating "knife-like" pains in his legs which his doctor diagnosed as sciatica.

Two months later he remembers having frequency of micturition and in March, 1921, a diagnosis of *diabetes mellitus* was made. He entered Royal Prince Alfred Hospital and was discharged with urine sugar free after eight weeks diabetic treatment.

He tried to return to his work, but found it too hard and has not done any since. His condition became progressively worse and he spent long periods in the Coast Hospital.

In March and May, 1924, he had coma and was strapped down on account of his restlessness. In November of the same year he was again unconscious, being taken to the Reception House. His third attack of coma occurred in April, 1925, just prior to his admission to Callan Park. This was necessitated on account of emotionalism and the fact that he had ideas of persecution at the hands of his wife. He was unreasonable at the home and his noisy habits at night were a source of annoyance to the neighbours. During his attacks of coma he became violent. He appeared not to realize the economic difficulties in his home, eight children and a sick husband requiring expensive "Insulin" treatment (fifteen units *per diem*) to be provided from less than the basic wage. In extenuation it would appear that his character has always been exacting.

On examination his mental condition, orientation, perception, recognition *et cetera* were perfect. He was depressed about his illness and had the ideas of persecution already mentioned. His intelligence was well above the average and he could give an excellent description of certain episodes from his state of coma: "I could imagine all sorts of things, saw vivid images, such as a shop front or its interior with the shelves holding goods. On one occasion when my son was feeding me I thought I was getting too much food and made a smack and my arm seemed to go straight through him." He volunteered a remark that these illusions were remarkably vivid. It is of psychological interest to note in the above that his mental imagery is coloured by food associations. This is also prettily illustrated in the same examination; he spontaneously gave me a new test phrase for testing articulation: "The crow flew over the river with a lump of red raw liver in its mouth."

Considering the degree of hyperglycæmia present, the slight mental impairment is curious. This is, however, to be expected since diabetes is rare in mental hospitals. This patient is the first in over one thousand admissions under my care and is actually the only one in hospital at the present moment affected in this manner.

Physically he was considerably emaciated and was so weak that he could hardly walk. His tongue was dry and reddish. His gait was of steppage variety. His heart and lungs appeared normal. His systolic blood pressure was 140 and his diastolic blood pressure 100 millimetres of mercury. The specific gravity of his urine was 1040; he passed from two to two and three-quarter litres (seventy to ninety ounces) a day and the urine contained sugar in large quantities. Acetone was present in the urine. His speech was slurred. The vision of the right eye was defective, but the pupils were equal and reacted to light and accommodation. Optic atrophy was present in the right disc. The tongue was tremulous. The sense of passive position was noted to be doubtfully impaired on legs. Tenderness of muscles on deep pressure was found. The knee jerks were present on the right side, but absent on the left. The plantar reflex was flexor; no ankle clonus was elicited; the abdominal reflexes appeared normal.

No reaction was obtained when the cerebro-spinal fluid and the blood (on two occasions) were subjected to the Wassermann test. There were twenty cells per cubic centimetre and the globulin test gave a strong reaction.

A diagnosis of diabetic tabes (so-called) was made. On this basis a diabetic peripheral neuritis would account for the sciatica, diminished reflexes, steppage gait, visual symptoms, absence of response to Wassermann tests and on the mental side simple hypochondriasis. The remarkable slurring of the speech and the serological finding were not quite consistent, but were accepted as part of the picture, in order to avoid postulating two separate lesions.

Progress.—The patient was at first placed on twenty units, increased later to twenty-five and later forty units of "Insulin" daily. He showed great improvement in his general condition. His weight rose from fifty-one kilograms (eight stone three and three-quarter pounds) in May, 1925, to seventy-three kilograms (eleven stone ten pounds) in October, 1925. But in the same period the sugar in the urine had diminished from 10% to only 5% and his blood sugar had fallen from five hundred and forty milligrammes to but three hundred and thirty-five milligrammes in spite of limitation of diet.

With slight fluctuations this condition persisted until January of this year, when it was decided to make further alterations in his treatment. Moreover, he was complaining again of knife-like pains in the sciatic and lumbar regions which were controlled only by exhibition of opiates.

Although two successive fast days produced a sugar free urine, even a small amount of food (Maclean diet No. 1)[1] was sufficient to give him hyperglycæmia. During this experimentation he had for the first time two epileptiform seizures. These were seen by an experienced attendant and were characterized by tonic and clonic phases. No further untoward symptoms occurred after the diet scale had been raised and "Insulin" recommenced.

In March the "Insulin" dosage was increased to sixty units *per diem* and for the first time, the output being 1·1 litre (thirty-eight ounces) daily, his urine has remained constantly sugar free and his blood sugar within normal limits in spite of considerable increases in the diet scale which now stands at day 11 on Maclean's tables.[2]

Today, April 5, 1926, the blood sugar reading is three hundred and thirty milligrammes; the diet scale will again have to be reduced.

A further examination enables us to modify the diagnosis.

Mentally he is very clear and were it not for the regrettable physical accompaniments would not warrant hospital care.

Physically he is still weak. His systolic blood pressure is now 82 and his diastolic blood pressure 42 millimetres of mercury.

The left knee jerk is absent and the right dull. Ankle jerks are absent. Plantar reflex is normal. The abdominal reflex is normal. No muscle tenderness is present. Some rhombergism is present when the patient stands on a narrow base. The pupils are equal and react to light and accommodation. He occasionally has sciatica (lightning pains). Speech is still slightly slurred, but has vastly improved.

Comment.

On the whole his signs and symptoms now suggest that previously a diabetic peripheral neuritis obscured the picture, but as this has faded, two separate lesions are seen to be present, namely *tabes dorsalis* and *diabetes mellitus*. The inference is strengthened by the latest serological finding, whilst no response was obtained to the Wassermann test of the blood, a slight reaction was obtained in the cerebro-spinal fluid. There are twenty-eight cells per cubic centimetre. The globulin test yields a reaction. The gold sol test gives a reading 5544321100.

Some intriguing speculations still, however, remain. Is the diabetes entirely pancreatic or is a medullary lesion partly responsible for the symptoms? Is there a causal relationship between the tabes and the diabetes or are they independent lesions? Does their presence offer a clue as to the production of tabes in that a sugar metabolic disturbance may be an exciting factor?

Although lightning pains occurred very early on the scene, his coincident physical debility makes it impossible to say with certainty whether *tabes dorsalis* or *diabetes mellitus* was the first to appear.

Tertiary lesions in viscera are rare in syphilis of the nervous system, but it is possible that the diabetes is due to a syphilitic pancreatitis.

Acknowledgment.

I am indebted to Dr. J. A. L. Wallace, Medical Superintendent of Callan Park Hospital, for permission to publish.

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(1) Hugh Maclean: "Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes," Third Edition, 1924, page 127.

(2) *Loco citato*, page 136.

AN UNUSUAL CASE OF HYDATID OF THE LIVER.[1]

By HAROLD R. DEW, M.B. (Melbourne), F.R.C.S. (England),

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THE patient, aged fifty years, was admitted to hospital with a history of pain in the liver area of some weeks' duration. Jaundice and pyrexia had been persistently present for one week. The general condition of the patient was bad and it was supposed that he was suffering from secondary carcinoma of the liver. On examination the liver was greatly enlarged and tender. Barium meal examination failed to yield any useful information. The diaphragm was seen to be elevated on the right side. Casoni and complement fixation tests for hydatid were carried out, but no reaction was obtained to either. The patient was under the care of Mr. Langlands who operated in order to determine the nature of the swelling. A large simple hydatid cyst of the under surface of the liver was found. It was full of bile stained fluid and contained brood capsules and scolices. The mother cyst was not removed owing to the patient's bad condition, a drainage tube merely being inserted. Bile was drained freely and he is rapidly improving.

This patient was shown as an example of failure of response to the Casoni test in the presence of a proved hydatid cyst. This is a very rare finding even in simple cysts and has been recorded in only three definite cases in my experience. The explanation is difficult, but it may be due to desensitization following the absorption of a large quantity of antigen after intrabiliary rupture or to non-antigenic properties in the fluid, this causing no original sensitization. The former appears to be most likely. A failure of reaction to the complement fixation test was to be expected as the cyst was simple. Both these tests will be made regularly during the next few weeks in order to ascertain if possible the time relatinoship of their appearancee. The case is instructive in emphasizing the necessity for care in interpretation of results from these tests in complicated hydatid conditions. It is expected that both these immunity reactions will soon occur.

I am indebted to Mr. F. Langlands for permission to publish this case.

[1] The patient described herein was shown at a meeting of the Victorian Branch of the British Medical Association on May 28, 1926.

VENESECTION IN PNEUMONIA.

By C. D. BATEMAN, M.B., Ch.M. (Sydney),

Leeton, New South Wales.

THE following case illustrates the satisfactory result which venesection often gives in individuals of the plethoric, full-blooded type, suffering from lobar pneumonia, when they are finding the effects of the toxæmia and the great effort required to maintain an efficient circulation to be rapidly overwhelming them. The improvement, gradual and imperceptible at first, which is effected by timely venesection, is most gratifying. The relief to the over-strained and dilated right heart, the rendering of the blood less viscid and the removal of a certain quantity of the toxin from the circulation appear to be largely responsible for the improvement in the patient's condition.

The patient, Mrs. F., aged about thirty years, was admitted to hospital during the afternoon of September 27, 1925, after being in bed for four days with influenza.

On admission she had a heavy cloud of albumin in her urine attributable largely, I expect, to an offensive gingivitis from which she was also suffering. Next day pneumonia of the lobar variety was discovered at the apex of the left lung. She was rather flushed, but on the whole was fairly comfortable. On September 29, her pulse rate began to climb. In the evening it was uncountable at the wrist, but over the cardiac region was found to be at the rate of two hundred and sixteen beats per minute. The respirations were rapid and shallow. Her cheeks were cyanosed and the skin cold, clammy and dusky in appearance. She complained of being very tired. Venesection was then done, one hundred and eighty cubic centimetres (six ounces) of dark rapidly coagulating blood being slowly removed. It had the consistency of almost light treacle. Drinks were given in small quantities fairly often. Thirty cubic centimetres of polyvalent anti-pneumococcal serum were injected and as a stimulant to the heart a hypodermic injection of digitaline (Nativelle) was given. During the night the pulse rate slowly came down till next morning at 7 a.m. it was ninety-six per minute. Later on at 10.30 a.m., the beats numbered eighty-four per minute and from that on the rate did not rise above one hundred. The crisis had taken place during the night and from then her recovery was uninterrupted.

This is the fifth case of pneumonia in which I have had to resort to venesection and the result in the other four has been equally satisfactory in bringing about the turn of the tide, apparently dying patients in what appeared hopeless conditions being transformed into convalescents. One of these patients, an elderly man of sixty-five years of age, after about five days' battle with an extensive pneu-

monia became very cyanosed and delirious. His pulse was so irregular in rate and volume that counting was impossible, faint flickerings alternating with larger and perceptible beats. Two lots of one hundred and twenty cubic centimetres (four ounces) of blood were removed with an interval of about five or six hours. Recovery gradually took place.

Reviews.

HISTORY OF PREVENTIVE MEDICINE.

IT is refreshing to turn from the misleading and often inaccurate statements found in the scientific and health columns of our daily press to the story of the romance of medicine rendered in the little book on the "Conquest of Disease" by Mr. David Masters.[1]

The choice of his subjects is wide and complete, ranging from Harvey on the circulation of the blood to Dr. St. John Brooks, the Curator of the National Collection of Type Culture in the Lister Institute and concluding with the fruitful endeavours of the Health Section in the League of Nations.

Each subject is treated with unusual care and written in brief yet graceful English, so that any senior schoolboy could read it with profit and enjoyment.

It is a pity that the opponents of vaccination could not be induced to read the fourteen pages devoted to the history of smallpox and Jenner's work on prevention. In this short space Masters gives a vivid account of the epidemics in Gloucester, London, Glasgow and the Philippines augmented by convincing statistics.

The work of Pasteur and Lister are given in an able manner, but the most interesting chapter is the simple and clear account of the yellow fever campaign by Surgeon-General Gorgas in the Panama Canal zone. It is pleasing to note that a mead of praise is given to the Sanitary Engineer, Mr. J. Le Prince, who was the great driving force in the campaign and without whose aid it is very doubtful if Gorgas could have accomplished such a striking achievement.

Throughout the book the whole tenor of the work is its scientific accuracy; so much is this in evidence that we can safely say it is one of the best if not the very best book written in later years on the advances of modern medicine.

On finishing this short notice we cannot do better than repeat the last paragraph written by Sir James Cantlie in the introduction where he says: "Sitting in my study I have sometimes thought of the book that might one day be written, a book that held all the glamour and fascination of life between its covers, that explained the fine achievements of medicine and shed a little light on the unseen wonders of the living body. I have waited for this book. Now I venture to think it has been conjured out of the human mind and I am happy to write these few introductory words."

ANALYTICAL REAGENTS.

THE BRITISH DRUG HOUSES, LIMITED, have published a work for the purpose of defining with the greatest possible accuracy "the commercially attainable standards for the purity of chemicals used for those scientific purposes in which purity is of great importance."[2] When the war excluded the supply of German analytical reagents, a joint committee was formed from the Councils of the Institute of Chemistry and the Society of Public Analysts. This body issued a list of specifications of purity for eighty-eight analytical reagents, indicated by the letters "A.R." The present volume is an extension of this "List of Reagents for Analytical Purposes" and additional tests have been made regarding the substances therein dealt with. It has been the intention to give greater precision to the older standards and the requirement that a substance gives no reaction for arsenic or no weighable residue, is replaced by definite limits. Unless a definite time is assigned before a result is to be observed, five minutes are allowed, but in some cases more strict tests have been made by the introduction of longer time limits. As regards glacial acetic acid it is directed that no precipitate should be formed with barium chloride, after it has stood for twelve hours, instead of two hours. Many new arsenic limits have been introduced and some of the original limits made more stringent. In the case of hydrochloric acid the arsenic limit has been reduced from one part per million to 0·04 part per million. In the monograph on granulated zinc, purified specially for arsenic testing, tests are given for sensitivity and oxidizable impurities. In connexion with the limit test for arsenic a description is given on page 105 of the modified form of the Gutzeit test with the apparatus fully illustrated.

As far as practicable methods for quantitative estimation are prescribed and standard percentages specified. However, in a few cases in which salts contain water of crystallization and are not permanent in air, no definite standard is laid down, only the method of estimation being given.

This little work constitutes a particularly handy book of reference, of inestimable value to the analytical chemist.

OPHTHALMOLOGY, OTOLOGY AND ALLIED STUDIES.

VOLUME III. of the "Practical Medicine Series," published annually in Chicago by The Year Book Publishers and directed by Dr. Charles A. Mix the editor-in-chief, upholds the high reputation of its previous issues.[1]

Not only is the year's activity in eye, ear, nose and throat comprehensively recorded, but in addition the editors of the several sections give their opinions of these activities, thus adding to the value of the volume as a review.

The ophthalmic section, edited by Charles Small, contains a wide survey of modern methods of ophthalmic investigation and treatment. Prominent items include the Gullstrand slit-lamp microscope and the phenomena it unveils, the gonioscope of M. Troncoso for examining the angle of the anterior chamber, the routine use of deep orbital "Novocaine" injections in intraocular operations, various operations, including an ingenious one for keratoconus by G. Young, protein therapy and a novel speculum.

Dr. Albert Andrews edits the aural department. This part of the book contains articles of interest on hearing tests, with especial reference to the audio-amplifier which is of value in discriminating between correctable and non-correctable deafness, statistics of ionization in chronic otorrhœa, modern mastoid surgery, local anæsthesia, operations for brain abscess, the function of the ossicles, the function and preservation of function of the Eustachian tube, sexual development, pregnancy and otosclerosis. From this list it will be gathered that the authors have covered a very wide range within a relatively small space.

In the part dealing with the nose and throat the comments of the editor, Dr. Shambaugh, are exceptionally illuminating, but as against this his English is frequently slovenly and sometimes obscure. His most interesting contributions are concerned with the choice of anæsthetics, the technique of oto-laryngologists, operative interference in scarlet fever, electro-coagulation therapy, diathermy for tongue cancer, for post-nasal growths and for tonsils, fifth nerve trouble, tuberculosis of the larynx and its treatment.

The value of such a series of year books lies not only in the facts and fancies actually brought before us, but in the stimulation of such scientific imagination as we may ourselves possess and in the quickening of our own activities.

[1] "The Conquest of Disease," by David Masters, with an Introduction by Sir James Cantlie, K.B.E., F.R.C.S.; 1926. London: John Lane. Sydney: Angus and Robertson, Limited. Crown 8vo., pp. 330, with illustrations. Price: 8s. 6d. net.

[2] "The B.D.H." Book of A. R. Standards. Issued by The British Drug Houses, Limited, London. London: Crown 8vo., pp. 111. Price: 1s. 6d. net.

[1] "The Practical Medicine Series," Comprising Eight Volumes on the Year's Progress in Medicine and Surgery: Under the General Editorial Charge of Charles L. Mix, A.M., M.D.; Volume III.: The Eye, Ear, Nose and Throat, Edited by Charles P. Small, M.D., Albert H. Andrews, M.D., and George E. Shambaugh, M.D.; 1925. Chicago: The Year Book Publishers. Crown 8vo., pp. 496, with illustrations. Price: $2 net.

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Research.

THE average medical practitioner, having equipped himself for his life's work of tending persons during illness, is satisfied to pick up stray pieces of information from a very limited library of current periodicals and new books during the course of his career. He is too busy to attend more than an occasional meeting of a medical society and much too busy to attempt to contribute knowledge to the common store. The few who are chosen to teach in our medical schools, rarely engage in research work. Their practices and their lectures and demonstrations make large demands on their time. It is true that many practitioners in the cities prepare and read papers at meetings of their colleagues and publish other articles in the medical press. Some of these papers and articles represent the result of careful observation in the clinic and some hard thinking. Actual research is carried out by a very small number of medical practitioners. By research is meant not only work in a laboratory, but all forms of investigation into the problems of health and disease. This fact, that the amount of real medical research is extremely limited in the Commonwealth, is to be deplored. It has to be recognized that the sum total of knowledge concerning the body in health and disease is still meagre, despite the enormous expenditure of energy in all parts of the world and the consequent progress in medical knowledge during recent years. There have been many important discoveries; genius has betrayed itself from time to time in the struggle with Nature to unveil some of her mysteries. But the medical profession cannot afford to stand still and to accept the dogmas that are taught in the schools as the unalterable dicta of science. It is a calamity that men and women who are possessed of the ability to prosecute research, do not strain every nerve to carry out some original work. It is true that the majority of medical practitioners are busy persons. It is equally true that their functions in attending to the sick are of great importance to the individual. But it is not true that they do not undertake investigations into the many problems with which they deal each day, because of lack of time. The reason is that our medical students are neither taught nor encouraged to do research work. Precept and example are at times wanting. Some of the teachers have themselves done but little research work; some have not attempted any. In addition there is the stern fact that research is not a remunerative occupation. The young graduate is too anxious to enter general practice at the earliest moment to take into serious consideration the proposal that he should learn to perform experiments and to master the technique of the laboratory before determining on his future field of activity. If students were offered inducements to assist their teachers in carrying out original research and encouraged to spend some time, a year or two, in training their minds to look for data, to plan experiments for the purpose of elucidating the truth concerning a function of the healthy body, some chemical or physical change encountered within the body or a departure from the normal behaviour of an organ or a tissue, those who are possessed of a natural aptitude for research, would feel the call and devote at least some of their energies in furthering medical knowledge.

There are vast fields in morphology, physiology, biochemistry, biophysics, pathology, immunology, hygiene and clinical medicine as yet unexplored. History indicates that natural aptitude for scientific research is not rare among Australians. There is therefore no excuse for the general neglect of this most important function of medical practitioners. Those who are inclined to regard the medical calling from a commercial point of view, cannot be expected to help in this great work. We must look to the true scientist to till the land, to sow the seed and to reap the harvest. But we may look in vain unless every professor and every teacher in our medical schools recognize that one of their most important functions is to conduct research and to cause the spirit of inquiry to spread among the students in virtue of its contagious nature. Every teacher should be expected to pub-

lish from time to time records of scientific investigations carried out by himself and his student assistants. Prizes should be awarded for the evidence of original thought and for the display of a critical spirit. If the problem were skilfully handled and properly developed, there would be a general uplifting of the tone of the profession and a great increment in its value to the community.

Current Comment.

EXPERIMENTAL EPIDEMIOLOGY.

VERY little is known concerning the mechanism of the spread of epidemic disease. Statistical inquiry and clinical methods as well as bacteriological research have been used and of late experimental investigation has been undertaken in connexion with this problem. It is not proposed to review the achievements and failures of these attempts in this place. Rather is it intended that attention should be drawn to important work of an experimental nature that has been carried out recently in both England and America. Professor W. W. C. Topley in the Milroy Lectures has described work done by himself and Dr. Major Greenwood[1] and Dr. Simon Flexner has given an account of experimental results obtained at the Rockefeller Institute for Medical Research.[2] The work of these observers represents years of patient and methodical effort, necessitating many thousands of pathological investigations and calling for great care and foresight.

Professor Topley believes that the present lack of knowledge is largely the outcome of faulty methods of inquiry. He holds that the origin and spread of any epidemic of microbial origin depends on variations in the normally existing relations between living organisms and that the actual outbreak of disease is only the end result of a progressive disturbance of this normal equilibrium. Hence the problem passes from the strictly medical to the general biological field. Professor Topley and Dr. Greenwood believe that the best method of elucidating the main questions at issue is to combine experimental and statistical methods by "developing an experimental biometry of epidemic disease." This they have attempted to do. They used large numbers of mice for their experiments and made *post mortem* examinations of all mice which died but which were not eaten by their companions. This included the large majority. The two diseases studied were mouse typhoid and mouse pasteurellosis.

Professor Topley and Dr. Greenwood fed a number of mice assembled in large cages with the causal organism of the disease and then added numbers of normal mice at varying intervals. They found that a considerable period might elapse between the occurrence of the first death due to the specific infection and the rise of the first epidemic wave. They assume that during the preepidemic phase some process goes forward which leads to a progressive alteration in the equilibrium between parasite and host and that it is only when a certain limited condition had been reached that an epidemic wave of mortality occurs. It is obvious that during the preepidemic phase the infection is certainly spreading amongst the "population at risk" and the investigators did not determine the incidence of disease other than by the death of the animal. When once an epidemic had been established, the further course of events was found to depend largely on the rate of introduction of susceptible hosts. If no such immigration occurred, the epidemic gradually died down, leaving a varying number of survivors. Thus a total mortality of between 65% and 95% occurred if an epidemic of mouse typhoid was allowed to run its course among a herd of mice kept in isolation, but complete extermination of the herd did not occur. It was found that if susceptible animals were added regularly to the herd, the variations in the death rate were mainly determined by the rate of immigration. If irregular additions were made, wide variations in the death rate occurred and it was concluded that the effect of any one addition was largely determined by the equilibrium between parasites and hosts existing at the time when the additions were made. The general conclusion from these experiments was that the movement of susceptible but uninfected individuals is one of the main factors in determining the course and duration of the epidemic spread of bacterial disease.

In discussing the question of dosage Professor Topley points out that in connexion with the spread of an infection among a herd the usual application of the term dose according to the number of viable bacteria received by an animal cannot be made. Dosage can be expressed only as a probability. The order and rate of doses as well as their functional significance must be considered. Professor Topley refers to experiments by Lockhart on the effect of variation in dosage of *Bacillus œrtrycke* in mice. It is obvious to him that large fluctuations in dosage over a wide range may make relatively little difference in the resulting percentage mortality.

The term virulence as used at present is misleading. Two factors are involved, the ability of the organism to proliferate at the point of entry or the ability to produce some toxin at the point of entry or to invade the tissues and produce death from a general infection. There is no justification for the assumption that both these properties are always highly correlated. In discussing the question of virulence, Professor Topley refers again to the work of Lockhart who found that strains of *Bacillus œrtrycke* might manifest a definite decrease in virulence after repeated subculture in broth. He also gives details of some experiments of his own in which the virulence of organisms was tested. He holds that a strain which is more virulent, produces a higher percentage of total infection, lethal and non-lethal, but that this difference is not so great

[1] *The Lancet*, March 6, 13, and 27, 1926.
[2] *The American Journal of the Medical Sciences*, April and May, 1926.

as the difference in percentage mortality. Lockhart's work has indicated that strains which are relatively avirulent, may still produce a high proportion of non-lethal infection. These observations are at variance with those of Dr. Flexner, as will be shown later.

Professor Topley refers to the resistance or immunity of the host. In the present stage of knowledge this term is, of course, incapable of accurate definition and Professor Topley is prepared to be content with a vague description of the host's defensive powers. He points out, however, that when immunity with the herd as the unit instead of the individual is discussed, some new factors are introduced. A herd may increase its average resistance by a process of simple selection, in other words by the elimination through death of its more susceptible members. The initial distribution of resistance among units of the population will almost certainly be uneven. Moreover, there is no reason to suppose that the resistance of an individual will be constant throughout the course of an epidemic. It is safe to assume that some process of active immunization will be associated with the occurrence of non-fatal infection though the degree of immunization and its importance may be difficult to assess. It is interesting here to recall the fact that Dudley in his important study on epidemiology of diphtheria and scarlet fever formed the conclusion that coincident with an epidemic of diphtheria there was an epidemic of immunization. Dudley held that the occurrence of an epidemic of immunity at the same time as that of an epidemic of infection was a more plausible explanation of the facts concerned than the vague supposition of a mysterious change either in the virus or in the population. It may be pointed out here that when fresh batches of mice were added to cages containing mice some of whom had already weathered the storm of a severe infection, many of the latter ultimately died.

Profesosr Topley discusses the alternative methods causing increased resistance. In regard to the question of selection he describes in detail many observations carried out by himself and Dr. Greenwood and he discusses the work of Webster and Pritchett. These workers hold that there exist strains of mice manifesting divergent degrees of resistance. Professor Topley cannot accept all the findings of these workers and he holds that the question remains unanswered in the sense that it has not been clearly demonstrated that there is an innate variation in the natural resistance of mice to a particular bacterial infection of such a nature and degree that a selective increase in the average resistance of the herd would inevitably result during an epidemic caused by the organism in question. In regard to the possibility of a process of active immunization taking place Professor Topley refers to observations on the pathological examination of infected mice and concludes that some part at least of the relative immunity of surviving animals is due to active immunization.

In referring to extrinsic factors other than the quantitative and qualitative relations between parasites and hosts in the determination of the spread of an epidemic, Professor Topley states that he and Dr. Greenwood have carried out experiments on the possible rôle of the bacteriophage in the epidemic spread of mouse typhoid. Their results failed to show that any part was played by this agent.

The experiments carried out by Dr. Flexner were different from those of Professor Topley and Dr. Greenwood. He and Dr. Amos used in their work a "mouse village" consisting of a number of cages. They relied on the transfer of the infection taking place through contamination of the hands of the attendant who fed the mice. The results described by Dr. Flexner are very similar to those of the English observers as far as the preepidemic period and the waves of spontaneous epidemics were concerned. He too found that once sporadic deaths occurred in the mouse village all that was required to bring the low attack rate to high attack and death rate was to introduce healthy mice not previously exposed to the infection. He found, as Professor Topley found, that when new mice were added, the older mice became affected and died. He explains this as being due to dosage of bacilli.

Dr. Flexner investigated the questions of virulence and dosage. Five strains of paratyphoid bacilli were tested on about fourteen hundred mice. The stools and blood were studied by culture and the blood was tested for agglutinins. It was found that the mice fell into three groups. The five bacillary strains differed among themselves in degree of virulence, but each one remained constant in its pathogenic action upon mice and was unaffected by animal passage. It could be shown, therefore, that the epidemic outbreak of greater or less severity of mouse typhoid was determined in large measure by inherent degrees of bacillary virulence. The effect of dosage was tested by giving fixed quantities of cultures of given strains of bacilli to mice of selected weight and of the same lots as regards parentage and food. Consistent results, as shown by the numbers of survivors and of those who succumbed, were obtained. From these findings it is concluded that the susceptibility of a mouse population to mouse typhoid infection is a relative or graded property and that the dosage as determined by the quantitative and spatial distribution of the bacilli is a definite factor or constant.

In conclusion, Dr. Flexner discusses Professor Topley's results more particularly in regard to the daily introduction of fresh mice and their introduction during the decline of an epidemic. He does not agree with Professor Topley that the explanation lies in fluctuation of the virulence of the bacilli. He accepts Webster's findings as accurate that bacilli do not fluctuate in this manner and adopts the view that host susceptibility and dosage of bacilli largely affect infection and death.

These observations give but a rough outline of the scope of the work which has been undertaken by these investigators. Other possible factors in the spread of epidemic disease should be sought and studied.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Circulation and its Measurement.

ONE of the outstanding needs today in the study of the circulation is a means of determining the functional efficiency of the circulation in man in all conditions; in other words, a simple and fairly accurate method for measuring the circulation in man. Various methods have been tried, but none are very accurate and all can be used only under special conditions. Yandell Henderson and H. W. Haggard (*American Journal of Physiology*, June, 1925) have studied the various methods and the principles underlying them and have devised a method which is comparatively simple and at the same time accurate and can be used under all conditions. Air containing a minute concentration of ethyl iodide is breathed for five or ten minutes and then are determined the volume of air breathed per minute, the content of ethyl iodide in the inspired air, the content in the expired air and the concentration in the alveolar air. The first factor is multiplied by the difference between the second and third, and gives *a*, the amount of ethyl iodide absorbed per minute. The fourth factor is multiplied by the coefficient of solubility and gives *b*, the amount in the arterial blood. Then *a* divided by *b* gives the volume of the blood flow through the lungs, in other words the circulation. The stroke index, that is the amount of blood flowing through the lungs in a minute divided by the product of the body weight and the pulse rate per minute or the amount of blood put out by the heart per beat per kilogram of body weight during rest in normal persons ranges from 1·3 cubic centimetres to 1·8 cubic centimetres. In some individuals it is much larger in the recumbent position up to 2·0 cubic centimetres or more and much smaller in the standing position, down to 1·0 cubic centimetre or less. During vigorous exercise the stroke index may rise to about 3·5 cubic centimetres. The oxygen difference between arterial and venous blood is in normal persons during rest about four volumes *per centum*. This means that the circulation is normally so large in relation to the oxygen consumption of the body that the venous blood returning to the heart contains on an average only four volumes *per centum* less oxygen than the arterial blood. The blood stream pumped by the heart is thus about twice as large as was formerly supposed. During bodily rest its volume in litres is about equal to the volume of air breathed per minute. During exercise respiration may increase eight or ten fold and the circulation four or five fold. In patients suffering from cardiac conditions the inefficiency of the circulation shows itself in the increase of the arterio-venous oxygen difference above the normal value. The capacity of the circulation to keep the oxygen difference down and thus to keep the pressure of oxygen in the tissues up appears to be the limiting factor in the maximum power that can be sustained by athletes at one end of the scale and by patients suffering from cardiac conditions at the other.

Regulation of the Heart Rate.

BY the use of the method of cross circulation, by which the head of a dog and the heart-lung preparation are separately circulated with blood, G. V. Anrep and H. N. Segall have studied the effect on the heart rate of variations in the blood pressure and heart output (*Journal of Physiology*, April, 1926). In this preparation the heart is innervated normally, but the brain from which the nerves come, has a different circulation from the heart, so that variations can be made in the pressure in the brain without affecting the pressure in the heart-lung preparation. They find that the heart rate is directly influenced by the blood pressure in the brain. A rise in the cerebral pressure caused a slowing of the heart rate, an effect determined by the reciprocal action of the vagus and sympathetic nerves. Anoxæmia of the brain diminishes and finally reverses the central effect of blood pressure upon the heart rate. The heart rate was also found to be influenced by reflexes arising from changes in the aortic blood pressure. A rise of pressure caused a retardation of the heart. An increased output of the heart gave rise to a reflex acceleration of the heart beat.

Action of Histamine.

J. H. BURN AND H. H. DALE (*Journal of Physiology*, April, 1926) have studied the effect of histamine on the circulation and the relation of the effects produced to other substances such as adrenalin. They perfused the limbs of animals with blood containing histamine and found that the vessels were relaxed. In cats the tone favouring this reaction was evanescent, but could be regularly restored by a trace of adrenalin and occasionally by pituitary extract. They suggest as a result of these and other experiments that there is a special physiological antagonism between adrenalin on the one hand and a capillary-dilator principle on the other hand which closely resembles histamine in its action. Each of these substances, adrenalin and histamine, injected in small doses, causes an accelerated output of its antagonist. It is hardly likely that this natural output of each antagonist in response to the sudden appearance in the circulation of excess of the other occurs only under the conditions favouring its detection. The authors present evidence which seems to point to the lungs in particular as a source of a histamine-like antagonist to adrenalin. The facts do not warrant the suggestion that the lungs are the only or even the principal place of origin of such a substance under physiological conditions. Action of a histamine type provides, at least in many species, one side of a balanced chemical control of capillary tone of which the other is provided chiefly by the natural secretion of adrenalin.

Pituitrin and Diuresis.

THE earlier workers on the action of extracts of the posterior lobe of the pituitary found that the extract caused a polyuria. A theory of the pathogenesis of *diabetes insipidus* was based on the hypofunction of the pituitary. Later workers found that injections caused not a polyuria, but an oliguria and their results concorded with the action of the extract in *diabetes insipidus*. The explanation of these differences lay in the fact that the earlier workers used anæsthetized rabbits and the later workers unanæsthetized animals. M. Labbé, P. L. Violle and E. Azerad (*La Presse Médicale*, April, 1926) have studied the effects of extracts of the posterior lobe on normal men. After the bladder was emptied at 7 a.m. two hundred cubic centimetres of water were taken every half-hour for two hours and the urine was collected every half-hour. In all the subjects the whole of the eight hundred cubic centimetres of water were eliminated within four hours. Next day the same experiment was done, but after the first two hundred cubic centimetres of water were taken the equivalent of half a posterior lobe of an ox pituitary was injected. None of the subjects eliminated the water in four hours, indeed ten to twelve hours elapsed before there was any diuresis and then it was not great. In another series of experiments the effects of sleep were determined. It was found that when the extract was injected in the evening there was no diminution in the amount of urine passed during the night. Further in some of the subjects when the injection was given at night there was an increase in the amount of urine passed in the next twenty-four hours. It seems then that sleep removes the oliguric effect of pituitrin in the normal subject. It is suggested that this is due to the vasodilatation which occurs during sleep. Krogh has shown that small doses of pituitrin cause contraction of capillaries in the skin and the authors suggest that it produces a similar effect on the capillaries in the kidneys.

Visceral Pain and Referred Pain.

J. A. RYLE (*The Lancet*, May 1, 1926) discusses at length the mechanism of pain in relation to diseases and affections of the viscera. He endeavours to support the following hypotheses: That there is a true visceral pain felt by the viscus; that visceral pain is due to an abnormal increase in the tension of the muscular element of the wall of the viscus, this increased tension resulting either from contraction or from a failure on

the part of the muscle fibre to relax adequately in the presence of increased intravisceral pressures; that visceral pain when occurring alone or dissociable from attendant somatic pains, may be accurately localized by the patient; that referred somatic pains and tenderness, for example the viscero-sensory reflexes and the associated viscero-motor reflexes, although they may accompany a severe visceral crisis of mechanical origin, more frequently express an inflammatory lesion of the viscus; that when persistent they invariably express organic disease of the viscus of an inflammatory kind. He supports these hypotheses by evidence from pain in different viscera under different conditions. By analogy it seems reasonable to insist that the plain muscle of the hollow viscera is endowed with the same sensibility, positive and negative, as the skeletal muscles; in other words, that visceral sense is muscle sense. The sensations of fullness or emptiness are thus parallel with the sensations of posture and tension in a limb. Pain, whether in skeletal or plain muscle, results when tension is greatly exaggerated in one manner or another. The one common factor present in all cases of visceral pain is an increase in intravisceral pressure and in muscular tension. Visceral pain expresses a perturbation of visceral function (which may or may not be due to organic disease), while the somatic phenomenon generally express a structural lesion of the wall of the viscus.

BIOLOGICAL CHEMISTRY.

Removal of Thyreoid Apparatus.

J. GREENWALD (*Journal of Biological Chemistry*, January, 1926) has been of the opinion that there are only two well authenticated metabolic changes in the body after complete removal of the parathyreoid glands. One change is the lessened concentration of calcium in the plasma and the other is the diminished excretion of phosphorus in the urine. These changes are regarded as intimately connected with the sequence of symptoms. The author has continued his observations on this problem by studies upon dogs from which the whole thyreoid apparatus has been removed. The success of the ablation has been inferred from the relative amounts of phosphorus and nitrogen in the twenty-four hours samples of the urine. Estimations of the amounts of calcium, silica and phosphorus in different forms have been made on the blood together with determinations of the calcium and phosphorus in the urine and in the fæces. From these figures the retention of lime and phosphorus within the dog has been calculated. The changes consequent upon the use of different rations, of injections of various salts of calcium and of sodium phosphate, of the oral administration of preparations containing calcium and of starvation have been studied in a number of animals. The administration of calcium to animals completely deprived of their thyreoid apparatus leads to a considerable retention of calcium phosphate within the body. This retention is due to deposition in certain tissues. Later calcium equilibrium was observed in these dogs from which the thyreoid and parathyreoid had been removed. When a liberal supply of lime was given in the diet the dogs which had undergone ablation required as large an injection of sodium phosphate to induce tetany as is required by normal dogs. When the supply of calcium in the food is lessened, the thyreoparathyreoidectomized dogs more easily suffer from tetany after injections of sodium phosphate. The author puts forward the view that the concentration of calcium in the plasma is regulated by an equilibrium between inorganic calcium and an organic compound of lime. In some respects this organic substance resembles calcium citrate.

Fate of Creatin.

A. CHAUTIN (*Journal of Biological Chemistry*, January, 1926), has made many observations upon the fate of creatin after its administration to two men. The subjects lived upon diets of shredded wheat, bananas, bread, butter, strawberry conserve, sugar and milk which represents rations free from creatin. The amount of food represented 3,460 calories daily. Creatin was taken when used dissolved in weak tea at the noon meal. The experimental periods were twenty-nine and forty-four days during which two hundred and fifty grammes and three hundred and forty grammes of pure creatin were ingested. Numerous analyses of the urine have been made. The results show that a definite transformation of creatin to creatinin takes place when creatin is given *per os*. The data obtained are considered to show that the additional creatinin excreted is derived directly from the creatin swallowed. No evidence was found of any bacterial decomposition of creatin in the alimentary canal. There is, however, an indication that creatin may be regarded as a sparer of protein.

Nitrogen and Nephritis.

H. JACKSON AND M. D. RIGGS (*Journal of Biological Chemistry*, January, 1926) have made some experiments upon the effects of diets, rich in protein, fed to rats. In 1919 Newburgh stated that he had fed three groups of rabbits with diets of egg-white, casein and soya bean over a long period and had found evidence of acute, subacute or chronic nephritis in many of them. Many of the rats, however, showed signs of ill nutrition and further the pathological signs of chronic nephritis were somewhat equivocal. In 1921 Newburgh in collaboration with Squier fed patients with high blood pressures with diets rich in protein. After periods up to twenty-one days they noted the presence of albumin and of erythrocytes in the urine. At the same time the blood urea was increased. The authors have fed rats of known ancestry and pure healthy stock on various diets for one-third of animal's life. In the rations high in protein the proteins have formed more than three-fourths by weight of the ration. Water has been given freely. Two sets of experiments have been conducted, one with casein and the other with egg albumin. The groups in the experiments have been subdivided to permit of the administration of alkalis in the form of bicarbonates in case there should be effects due to acidosis. Suitable controls have been instituted. All the rats have grown well with one exception. The tests on the blood show that the rats eating much protein had much higher figures for non-protein nitrogen in the blood. There has been no anæmia. Histological examinations of the kidneys have been carried out. In no case have the tubules or glomeruli or blood vessels presented any evidence of inflammatory degenerative or proliferative lesions. The kidneys of all rats appeared microscopically and grossly normal. The authors conclude that they have been unable to produce in rats any recognizable nephritis by feeding them on diets rich in protein for periods from ten to twenty months.

Site of Formation of Ammonia.

SIDNEY BLISS has made an extensive study of the formation of ammonia in the animal body (*Journal of Biological Chemistry*, January, 1926). The conclusion of Nash and Benedict relative to the formation of ammonia exclusively in the kidneys is based upon the greater concentration of ammonia in the blood of the renal vein than in that of the renal artery and on the absence of accumulated ammonia in the blood of a dog subjected to bilateral nephrectomy. Although this result has been widely accepted, the author brings forward evidence which leads him to conclude that the formation of ammonia in the kidneys is only part of a widespread formation of ammonia in the tissues. He confirms all the data brought forward by Nash and Benedict. The author shows firstly that blood in the veins from many organs contains more ammonia than the arterial blood entering the organ; particularly he shows that blood from the pancreas and from the spleen in the veins contains at least as great an excess of ammonia over arterial blood as blood in the renal veins. In the next place he points out that dogs subjected to nephrectomy vomit freely. He finds that this vomitus contains much ammonia. In one dog while the whole arterial blood contained only 8·1 milligrammes of ammonia, there was excreted in the vomitus two hundred and eighty milligrammes of ammonia. The author has been also able to show that accumulation of ammonia in the blood may take place, when its excretion through the kidneys is prevented.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING OF THE MELBOURNE PÆDIATRIC SOCIETY was held at the Children's Hospital, Melbourne, on June 9, 1926, DR. A. P. DERHAM, the President, in the chair. The meeting took the form of a series of clinical demonstrations.

Letter of Condolence.

Before the demonstrations took place the Secretary was asked to forward a letter to the widow and family of the late Dr. Frank Andrew conveying to them the sympathy of the Society in their sudden bereavement.

Aortic Regurgitation.

DR. W. W. MCLAREN showed a boy, aged six years, who had been admitted with a history of joint pains, vomiting and anorexia of six days' duration. This had been accompanied by sore throat. He had had three similar attacks previously. The heart was enlarged and a loud systolic murmur was audible at the apex and conducted to the axilla; at the base of the heart a loud "to and fro" murmur was heard. The systolic blood pressure was 84 and the diastolic 50 millimetres of mercury. A diastolic shock was distinctly audible over the brachial and femoral arteries. The serum had not reacted to the Wassermann test. Dr. McLaren regarded the condition as one of rheumatic endocarditis probably superimposed on a congenital heart disease. He had seen several children with signs of aortic disease who when traced to young adult life manifested well defined mitral stenosis and apparent disappearance of the aortic lesion.

DR. J. W. GRIEVE regarded the condition as certainly a lesion of the aortic valves and quoted several *post mortem* specimens of rheumatic endocarditis with vegetations on the aortic as well as the mitral valves.

DR. A. P. DERHAM agreed that the child should be treated as though suffering from rheumatic heart disease.

Jaundice.

Dr. W. W. McLaren's next patient was a girl, aged three years, who had suffered from persistent jaundice for two months. There had been attacks of mild colicky pain, the stools had been clay coloured and the urine dark in colour. The liver was enlarged to below the level of the umbilicus and the gall bladder was easily palpable. Laparotomy had been performed but, apart from the enlarged liver and distended gall bladder, nothing further was discovered at operation. The gall bladder was drained and the patient had improved slightly since. The serum gave no reaction to hydatid or Wassermann complement fixation tests. The Van den Bergh test gave a direct positive result. Occult blood had been present in the fæces and a tarry stool on one occasion. The blood picture on admission had been: Erythrocytes, 1,060,000 per cubic millimetre; leucocytes, 29,000 per cubic millimetre and hæmoglobin value 50%. After operation the erythrocytes had numbered 1,000,000 and the leucocytes 15,000 per cubic millimetre with a hæmoglobin value of 50%. Dr. McLaren asked for an expression of opinion as to the diagnosis.

DR. J. W. GRIEVE remarked on the rarity in children of the gall bladder being so distended as to be easily palpable on abdominal examination.

DR. F. KINGSLEY NORRIS suggested that the condition might be a primary malignant disease of the liver.

MR. C. H. C. SEARBY asked why the gall bladder should be so extremely distended with a primary liver condition and suggested an obstructive condition of the common bile duct.

DR. GERALD WEIGALL, Junior, stated that the condition of obstructive jaundice had apparently been relieved to a certain degree since operation, as the stools were bile coloured and the urine paler, while the intensity of the jaundice was distinctly less.

Postencephalitic Symptoms.

DR. W. W. MCLAREN showed a baby, aged eight months, which had been restless and irritable for three weeks. During fits of crying the child would open and close the hands and alternately flex and extend the toes, the movements being apparently equal on both sides. The day before the onset of these symptoms the baby had fallen out of its wheel chair. On admission to hospital, apart from the rhythmical movements, nothing abnormal had been revealed by routine physical examination. The temperature was elevated for the first week, but had gradually subsided and the movements had also ceased. The child had then begun to vomit persistently after each feeding and during the attacks of vomiting often became very collapsed and exhibited an inequality in the size of the pupils. Several examinations of the optic discs had revealed nothing abnormal. The cerebro-spinal fluid had been clear and under increased pressure and contained forty cells per cubic millimetre. There was no indication of a fracture on X ray examination of the skull. Dr. McLaren considered the child's condition to be due to encephalitis or the after results of the fall and he presented the patient for any further suggestions as to the diagnosis.

DR. A. P. DERHAM remarked that parents frequently associated nervous lesions in children with an antecedent head injury and in a great many cases the history of a fall could be disregarded entirely, as most normal children had received some injuries to the head during infancy and early childhood.

Jacksonian Epilepsy.

DR. A. P. DERHAM showed a baby, aged twenty-one months, who had first come under observation at the age of six months with severe breath holding attacks during which the child became blue and apparently unconscious. There was a history of difficult forceps delivery and a convulsion shortly after birth. Examination revealed a small depressed fracture of the left frontal bone. The breath holding attacks had increased in frequency and severity and assumed the form of Jacksonian epilepsy with twitching, commencing usually on the right side. Full doses of bromide and chloral hydrate had lessened, but had failed to control the attacks. In July, 1925, Mr. W. G. D. Upjohn had trephined the left frontal region and found that a large portion of the fronto-parietal area of the brain was occupied by a blood cyst. In a short time after operation the fits had improved without drug treatment, but had soon increased again. "Luminal" had then been administered in doses of 0·03 to 0·06 gramme (one half up to one grain) three times a day. This at first had controlled the fits, but later had seemed to lose its influence, the child having as many as seven severe convulsions in one day. The "Luminal" had then been stopped and the fits had also stopped and then gradually returned, but were much less severe. Dr. Derham explained that the child was developing normally both physically and mentally as far as could be ascertained. The child was shown in order to illustrate apparently normal development after a severe brain injury and also the paradoxical effects obtained during the administration of "Luminal." No reaction had been obtained to the Wassermann test.

Hydrocephalus.

DR. H. BOYD GRAHAM showed a male child, aged two years and nine months, suffering from hydrocephalus. When the mother was five months pregnant she had been told that the child's head was too large and labour had been induced at eight months on that account. At birth the head circumference had been 48·7 centimetres (nineteen and a half inches). Except for the large head the baby had appeared to develope normally up to the age of nine months, when he suddenly became affected by a squint and some paresis of the left ocular muscles and left side of the face. Since this time the head had been getting progressively larger.

The mother's serum had not reacted to the Wassermann test.

The optic discs manifested no abnormal changes. An injection of phenolsulphonephthalein into the lateral

ventricle had been performed. Five minutes later lumbar puncture had revealed clear fluid under increased pressure, but no indicator could be detected on dropping the fluid into 25% caustic soda. A second lumbar puncture thirty-five minutes later had also revealed clear fluid and again no indicator could be demonstrated. The urine two hours after injection had manifested a definite pink colour. Dr. Graham showed this patient for suggestions as to prognosis and treatment.

MR. C. H. C. SEARBY considered that operation would not be of any assistance in this case. In general operative treatment, if of any assistance, should be carried out during the first twelve months.

MR. H. C. COLVILLE regarded the hydrocephalus as of the communicating type owing to the great pressure under which the fluid was obtained at lumbar puncture. He agreed that surgical treatment would be of no avail.

DR. F. KINGSLEY NORRIS quoted three similar cases in which the carotid arteries had been ligated. Of these two patients had shown no change, but the third had been slightly improved.

Postpolioencephalitic Condition.

DR. J. W. GRIEVE showed a girl, aged thirteen years, who at the age of eight months had fallen from a cushion on to her head and for one month afterwards had been semiconscious and had had complete paralysis of the right side of the face and right arm and leg. At that time her condition had been regarded as infantile paralysis and she had never regained full power in the arm and leg since. The general health had been good until three years previously when the child commenced to have attacks of *petit mal*. These had become more frequent and more severe and had been accompanied by uncontrollable movements of the right hand and foot. Dr. Grieve regarded the condition as a late result of polioencephalitis and with the onset of athetoid movements and epileptiform seizures he considered there would be no further improvement and probably progressive mental impairment.

DR. H. BOYD GRAHAM considered the condition as probably the late result of hemiplegia following the head injury at the age of eight months.

DR. F. KINGSLEY NORRIS quoted a somewhat similar patient who at the age of six years suffered from frequent epileptiform seizures. These had been regarded as a late complication of hemiplegia following an illness at the age of three years. She had failed to respond to "Luminal" and a bad prognosis had been given. Some improvement had then been noticed and no fits had occurred for eighteen months, but the girl was having frequent fits again and the mentality had deteriorated considerably. Dr. Norris remarked on the frequency with which nervous manifestations appeared at some considerable period after a head injury.

DR. DOUGLAS GALBRAITH suggested that hyoscine might be of some assistance in controlling the movements which he regarded as of the Parkinsonian type.

Lesions of the Nasal Septum.

DR. A. P. DERHAM showed three patients with extensive destruction of the anterior portion of the nasal septum. One, a boy, aged thirteen years, and two girls, aged two years, all failed to yield reactions to the Wassermann test, although the boy had previously given a "partial" reaction. All were illegitimate children and wards of State. The boy had a facies suggestive of congenital syphilis and was also mentally defective. The two girls were otherwise healthy. All had been treated with intramuscular injections of "Muthanol" for some months. The history of ulceration was clear in two cases, but not in the third. These patients were shown to illustrate an uncommon deformity and to obtain the opinion of members as to whether the condition might be syphilitic or tuberculous or could possibly be a congenital deformity in one instance.

DR. ETHEL OSBORNE expressed the opinion that there may have been a tuberculous lesion resembling lupus.

DR. W. W. MCLAREN did not regard all as syphilitic and considered one at least to be a congenital malformation owing to the symmetry of the lesion.

DR. H. BOYD GRAHAM would not regard any lesion as definitely syphilitic until the diagnosis was confirmed by the reaction of the patient's serum to the Wassermann test before antispecific treatment had been commenced.

Dr. Derham disagreed with Dr. Graham and considered that antisyphilitic treatment should be given when even a probable infection existed. The stigma of congenital syphilis existed only when official notification was made and not as a result of a provisional diagnosis and treatment.

Hermaphrodism.

DR. F. KINGSLEY NORRIS showed a baby, aged three months, who had been operated upon for right inguinal hernia. The sac had been found to contain the right ovary and tube and the latter had also been traced to the fundus of the uterus. The structure of the ovary had been confirmed by microscopical examination. Prior to operation the infant had always been regarded as a boy with complete hypospadias, cleft scrotum and delayed testis, but after the operative findings and a further inspection of the external genitalia it appeared that the infant was a female with enormously hypertrophied clitoris.

MR. H. C. COLVILLE referred to a patient of his who had been presented at a previous meeting of the Society and who had exhibited appearances almost the direct opposite to those of Dr. Norris's patient. This child had always been regarded as a girl until an operation for hernia revealed the presence of a testis in the sac. Much discussion had arisen as to what should be done with such a patient. Mr. Colville had advised that orchidectomy should be performed and with the consent of both parents this procedure had been adopted and the child was being brought up as a girl.

Rickets.

Dr. Norris next showed a boy, aged eight years, who was suffering from extreme deformities of the bones of both lower limbs. The clinical appearance and the X ray findings were in accordance with the late results of severe rickets in infancy, the interesting feature of this child being that he was one of a large family all reared on a dairy farm. The patient had always had plenty of milk, cream and butter and none of the other members of the family manifested any signs of rickets.

Hypertrophy of the Arm.

Dr. Norris's third patient was a baby aged two months with an hypertrophied left arm associated with a large capillary nævus of the left shoulder region. X ray examination had revealed an unusual condition of the bone at the lower end of the radius, consisting of necrosis with periosteal irregularity along the radial shaft which Dr. Norris considered was possibly syphilitic in origin.

Tuberculosis of the Knee Joint.

MR. C. H. C. SEARBY showed a boy, aged six years, who had had a swelling of the right knee since the age of four months. He had first attended hospital at the age of three and a half years on account of "flexor spasms" in the knee and at that time had had wasting of the thigh and calf muscles. No reaction had been obtained to the Wassermann test and X ray examination of the joint revealed nothing abnormal. The child had been treated with Scott's dressing and strapping for one month, Scott's dressing and a back splint for six months and then electrical treatment for three months. A second X ray examination had still revealed nothing abnormal in the joint and the patient had been allowed to walk and had been told to use the joint freely. The condition had apparently undergone temporary improvement. In March, 1926, he had again attended hospital with fluid in the knee joint, an increase of 1·5 centimetres (five-eighths of an inch) in circumference and 1·8 centimetres (three-quarters of an

inch) lengthening of the limb. X ray examination still revealed no bony or cartilaginous changes, but the joint was considered to be tuberculous, involving the synovial membrane. It was being treated in plaster. The patella and lower end of the femur were definitely larger on the affected side and this Mr. Searby considered to be the result of the counterirritation and incomplete immobilization which had been maintained for nearly twelve months.

Mr. Searby showed a second boy, aged five years, who attended hospital on account of a swelling of the right knee joint which had persisted since an injury fifteen months before. Flexion was limited to 75° and there was wasting of the thigh muscles. This patient also exhibited lengthening of the limb to the extent of 1·25 centimetres (half an inch). X ray examination of the joint revealed only some thickening of the synovial membrane, but no bony changes. Mr. Searby commented on the presence of lengthening of the limb in both of these patients and said that this feature was described by Whitman as being characteristic of tuberculous arthritis of the knee joint.

Clutton's Joints.

MR. J. G. WHITAKER showed a boy, aged thirteen years, who had a swelling of both knee joints which was regarded as typical of Clutton's joints. The boy also had Hutchinson's teeth and an elder sister had similar teeth and interstitial keratitis in addition.

Bone Cysts.

DR. ROBERT SOUTHBY showed a girl, aged seven years, who had complained of pain and tenderness in the right shoulder following a fall on the arm. Examination had revealed tenderness over the upper third of the humeral shaft, but no crepitus was detected. The radiologist had reported a fracture adjacent to the epiphyseal line in a pathological lesion of the bone, almost certainly a simple cyst. No expansion of the bone and no breaking through the cortex except at the site of the fracture were present. The patient's serum had failed to react to the Wassermann and hydatid complement fixation tests and the Casoni test. X ray examination of the opposite humerus had revealed nothing abnormal. Dr. Southby said that this patient exhibited all the main features of a bone cyst, namely, the occurrence in a long bone of a cyst which was usually single, but might be multiple. It arose in the metaphysis and extended as far as the nearest epiphyseal line, being limited by the epiphyseal cartilage. They occurred mostly in children, the disease being one of the growing period. The cysts were often first discovered on X ray examination for a fracture.

Dr. Southby presented a second patient, aged eight years, who had tripped and fallen on the outstretched left arm, after which she had had pain in the elbow region and inability to use the arm. There had been considerable swelling in the middle of the arm and crepitus was elicited at the middle of the humeral shaft. X ray examination had revealed a fracture of the shaft of the humerus at the site of a well defined oval area of rarefaction described as a simple bone cyst. Other investigations, as with the first patient, had yielded no information. This patient exemplified the type of bone cyst found in the middle of the shaft of long bones which was supposed to originate in the metaphysis in early childhood and migrate along the shaft with the growth of the bone. Both patients had been treated by immobilization of the arm simply by bandaging to the chest wall and in four weeks firm union had been obtained and the full range of movements of the arm could be performed without difficulty. This point was of interest in view of the fact that in a series of two hundred similar cases reported in the literature it was stated that only 4% had recovered without operative intervention.

MR. J. G. WHITAKER showed a girl, aged six years, with a large cyst in the upper end of the humerus which had been discovered on X ray examination of the arm following a minor injury resulting from a fall.

DR. HAROLD MOORE also presented a girl, aged ten years, who had complained of some bruising and pain in the arm following a fall some three weeks previously. There were no clinical signs of a fracture, but X ray examination revealed a well defined cyst in the middle of the shaft of the bone. Dr. Moore remarked that he had seen several similar conditions apparently subside completely after immobilization alone.

MR. C. H. C. SEARBY stated that the histological examination of these cysts revealed bone marrow and trabeculæ replaced by fibrous tissue in which calcium salts might be deposited later, a disappearance of the normal fatty tissue and an absence of leucocytic infiltration. The fibrous tissue might be localized or generalized throughout the bone and true bone might ultimately be laid down again. The commonest symptoms were swelling, a fracture or a limp. Bone cysts were not a common cause of non-union of fractures.

If the bone broke again after immobilization, then it should be opened and curetted. As a general rule the condition persisted throughout life, some might subside completely, but none became worse.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Belisario, John Colquhoun, M.B., Ch.M., 1926 (Univ. Sydney), 1, Manar Flats, Macleay Street, Potts Point.

Cooper, Alfred Leonard, M.B., Ch.M., 1925 (Univ. Sydney), 22, Wolseley Road, Drummoyne.

Wilson, Harold Frederick, M.B., Ch.M., 1925 (Univ. Sydney), Fairfax Road, Bellevue Hill.

Correspondence.

THE DEFENCE OF THE TONSIL.

SIR: What is all this hot stuff which my colleague, Dr. Norman McArthur, has served us for digesting during our week-end holidays? It has apparently shaken the profession in Melbourne and Adelaide to its foundations and tremors are reported from Queensland and Western Australia.

It is all very well to talk about fee splitting, but I wish to direct the profession's attention to a more important matter—that of splitting opinions and not arriving at the truth and doing unnecessary operations. As an instance of what I mean I think tonsillectomy rarely should be done and that the operation for enlarged tonsils and adenoids is very much overdone. Of course I am a throat, nose and ear specialist and perhaps take a straight and narrow view and lack the broad, flexible outlook.

I note that the doctors in charge of schools and Government departments send numerous patients to our clinic for removal of tonsils and adenoids. Often the patient requests the tonsil to be taken out by the roots or to use a golfing phrase: "No slicing, I must hole out in one." In most of these cases there is no need for operation at all.

I know perfectly well that the faucial naso-pharyngeal and lingual tonsils are the best friends the throat has. They are the guardians of the gate, the four first divisions to attack the enemy; I see them, the lymphoid cells in massed formation; I am asked to annihilate them, to remove the defenders and not the enemy. For some years past I have doubted the advisability of operating in these cases and after a recent visit to the most important clinics in the world I am convinced that my view is correct. Of course, some cases do require operation, but as a rule with attention to decayed teeth, pyorrhœa and the cause of the latter, defective use of the teeth and eating food too refined, operations can be avoided. I give the patients pure fresh milk, whole meal bread and whole meal porridge and other foods rich in vitamins which need chewing and so exercising the jaws and teeth. The teeth decay because

they are not used; the food is unsuitable. Vitamins are few or absent and so infection of throat occurs. With proper diet, hygiene, breathing exercises, blowing the nose to keep it clear, aided by ancient medical and modern serum and vaccine therapy most of these enlarged tonsils and adenoids will disappear and operation is unnecessary in most cases.

Yours, etc.,
JOHN MURPHY, M.D., F.R.C.S.I.

Senior Surgeon to the Throat, Nose and Ear Department, St. Vincent's Hospital, Melbourne.
June 11, 1926.

HOSPITAL PRACTICE.

SIR: If the system adopted by Dr. Jaede, as stated in your issue of June 12 last, be followed in the Commonwealth, it would certainly tend to strengthen the friendly bonds between hospital staffs and outside practitioners. Dr. Jaede may be interested to know that in Victoria the British Medical Association supplies its members with printed forms to be filled up when a patient is sent to a hospital and another printed form for the hospital authorities to fill in on the termination of treatment. When these forms are accompanied by a stamped, self-addressed envelope, we are supposed to have them returned to us, but I regret to say that in my experience the custom is more honoured in the breach than in the observance.

Yours, etc.,
JAMES BOOTH.

North Melbourne,
June 18, 1926.

Obituary.

JOHN FLYNN.

WE regret to announce the death of Dr. John Flynn which occurred at Sydney on July 8, 1926.

Naval and Military.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette* Numbers 45, 46, 50 and 54 of May 20, 27 and June 3 and 17, 1926.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH.
SEA GOING FORCES.

Ernest Dove Taylar, M.B., B.S., is appointed Surgeon Lieutenant (on probation), dated 9th April, 1926.

Transfer to Emergency List.—Surgeon Lieutenant Jack McKenzie Woods, M.B., Ch.M., is transferred to the Emergency List, dated 5th March, 1926.

AUSTRALIAN MILITARY FORCES.

Second Military District.

Second Division—Staff.

Colonel R. J. Millard, C.M.G., C.B.E., Australian Army Medical Corps, relinquishes the appointment of Assistant Director of Medical Services, Divisional Head-quarters, 21st May, 1926.

Australian Army Medical Corps.

The provisional appointment of Captain J. C. Shand is confirmed; Major R. B. North is transferred to the Australian Army Medical Corps Reserve, 13th May, 1926.

Captain S. McLennan is transferred from the General List of the Reserve of Officers, 1st July, 1925. (In lieu of the notification respecting this officer which appeared in Executive Minute, No. 116/1925, promulgated in *Commonwealth Gazette*, No. 47, of 11th June, 1925.)

Captain C. R. Palmer is appointed from the Australian Army Medical Corps Reserve, 29th May, 1926.

To be Lieutenant (provisionally).—Joseph Steigrad, 20th May, 1926.

Australian Army Medical Corps Reserve.

Captain C. W. Stump is transferred from the Australian Army Medical Corps Reserve, 4th Military District, 20th May, 1926.

Colonel R. J. Millard, C.M.G., C.B.E., is placed upon the Retired List, with permission to retain his rank and wear the prescribed uniform, 22nd May, 1926.

Captain W. M. Sinclair is transferred from the Australian Army Medical Corps Reserve, 4th Military District, 1st June, 1926.

Award of the Colonial Auxiliary Forces Officers' Decoration.

Australian Army Medical Corps.—Lieutenant-Colonel (Temporary Colonel) A. H. Tebbutt, D.S.O.

Third Military District.

Australian Army Medical Corps.

Lieutenant-Colonel J. J. Black, D.S.O., is appointed to command the 10th Field Ambulance and to be supernumerary to the establishment of Lieutenant-Colonels with pay and allowances of Major, 1st February, 1926. Lieutenant-Colonel N. L. Spiers is brought on the authorized establishment of Lieutenant-Colonels, 1st February, 1926. The provisional appointment of Captain C. E. V. Sutherland is confirmed.

Australian Army Medical Corps Reserve.

Captain W. Rock is placed upon the Retired List, with permission to retain his rank and wear the prescribed uniform, 9th May, 1926.

Fourth Military District.

Australian Army Medical Corps Reserve.

Captain C. W. Stump is transferred to the Australian Army Medical Corps Reserve, 2nd Military District, 20th May, 1926; the resignation of Honorary Lieutenant B. Thomson of his commission is accepted, 11th May, 1926.

Captain W. M. Sinclair is transferred to the Australian Army Medical Corps Reserve, 2nd Military District, 1st June, 1926.

Fifth Military District.

Australian Army Medical Corps.

The provisional appointment of Captain F. J. Clark is confirmed.

Proceedings of the Australian Medical Boards.

TASMANIA.

THE undermentioned have been registered, under the provisions of *The Medical Act* 1918, as duly qualified medical practitioners:

Craig, Clifford, M.B., B.S., 1924 (Univ. Melbourne), Launceston.

Murphy, George Edward, M.B., B.S., 1925 (Univ. Melbourne), Victoria.

THE MEDICAL DIRECTORY.

CIRCULARS containing forms to be filled in for the compilation of the Medical Directory have been addressed to every medical practitioner in Australasia. Those who did not reply to the first invitation, received a second

circular. There are still many who have not entered the details required on the forms and returned them to The Printing House, Seamer Street, Glebe, New South Wales. The form has been reproduced in this issue and will be found in the Advertiser. Members who have not already sent in their forms, are earnestly requested to tear out the page, to fill in the necessary details and to transmit it to this address as soon as possible.

THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN, SYDNEY.

WE have been asked to call the attention of our readers to the need for support of the Royal Alexandra Hospital for Children during the winter months. This hospital has to make provision for the medical care and treatment of very large numbers of infants and children in whose homes luxuries are unknown and comforts are scant. This hospital, like its sister institutions in Melbourne and the other capital cities, has a heavy task to perform and help is needed to enable those responsible to find the ways and means. Donations should be sent to Mr. Clarence R. Moss, General Organizing Secretary, Children's Hospital Office, Kembla Building, Margaret Street, Sydney.

Books Received.

THE COMPARATIVE ANATOMY, HISTOLOGY AND DEVELOPMENT OF THE PITUITARY BODY, by G. R. de Beer, M.A., B.Sc., F.L.S.; 1926. Edinburgh: Oliver and Boyd. Royal 8vo., pp. 108, with illustrations. Price: 12s. 6d. net.

EMERGENCY SURGERY: THE MILITARY SURGERY OF THE WORLD WAR ADAPTED TO CIVIL LIFE, by George de Tarnowsky, M.D., F.A.C.S., D.S.M.; 1926. Philadelphia: Lea and Febiger. Royal 8vo., pp. 734, with illustrations. Price: $7·50 net.

Medical Appointments.

The undermentioned appointments have been made in the Adelaide Hospital: Honorary Gynæcologist, Dr. William Alfred Verco (B.M.A.); Honorary Assistant Gynæcologist, Dr. Rupert Eric Magarey (B.M.A.); Honorary Aural Surgeon, Dr. Hubert Melville Jay (B.M.A.); Honorary Assistant Aural Surgeon: Dr. William Clifford Sangster (B.M.A.); Honorary Assistant Ophthalmologists, Dr. John James O'Grady (B.M.A.) and Dr. James Brook Lewis (B.M.A.).

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The undermentioned have been appointed Medical Referees for the purposes of *The Workers' Compensation Act*, 1912-1924: Dr. H. G. Tymms (B.M.A.), Perth; Dr. A. Juett (B.M.A.), Perth; Dr. F. Gill (B.M.A.), Perth; Dr. F. A. Hadley (B.M.A.), Perth; Dr. A. H. Gibson (B.M.A.), Fremantle; Dr. Martell, Fremantle; Dr. Badock, Midland Junction; Dr. Stewart, Midland Junction; and Dr. A. Clarke (B.M.A.), Midland Junction, Western Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xxii.

ALFRED HOSPITAL, MELBOURNE: Medical Superintendent.

AUCKLAND (N.Z.) HOSPITAL BOARD: Assistant in the Pathological Department.

AUSTIN HOSPITAL, HEIDELBERG: Male Junior Medical Officer (Two Vacancies).

AUSTIN HOSPITAL, HEIDELBERG: Senior Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Honorary Psychiatrist.

THE PUBLIC SERVICE BOARD: Medical Officer in Charge.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital. Cook District Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Ceduna, Wudinna (Central Eyre's Peninsula), Murat Bay and other West Coast of South Australia Districts.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

JULY 19.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JULY 20.—Tasmanian Branch, B.M.A.: Council.
JULY 20.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JULY 21.—Western Australian Branch, B.M.A.: Branch.
JULY 21.—Central Northern Medical Association, New South Wales.
JULY 23.—Queensland Branch, B.M.A.: Council.
JULY 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JULY 27.—Illawarra Suburbs Medical Association, New South Wales.
JULY 28.—Victorian Branch, B.M.A.: Council.
JULY 29.—New South Wales Branch, B.M.A.: Branch.
JULY 29.—South Australian Branch, B.M.A.: Branch.
AUG. 3.—Tasmanian Branch, B.M.A.: Council.
AUG. 4.—Victorian Branch, B.M.A.: Branch.
AUG. 4.—Western Australian Branch, B.M.A.: Council.
AUG. 5.—South Australian Branch, B.M.A.: Council.

Editorial Notices.

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